Plane Talk

AUGUST • 1945

Vice Admiral Aubrey W. Fitch, who was Deputy Chief of Naval Operations for Air until July, when he was appointed Superintendent of the Naval Academy at Annapolis and Commandant of the Severn River Naval Command.

The Planes of Tomorrow—by I. M. Laddon • Till the Boys Come Home—by Fred B. Barton

The Coming Boom in Air Transport—by W. C. Wold

Plane Talk

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Our Cover

Vice Admiral Aubrey W. Fitch, who became Deputy Chief of Naval Operations for Air on August 1, 1944, is a flying Admiral. He had his flight training at the Naval Air Station in Pensacola, Florida, and was designated as Naval Aviator in February of 1930. As Deputy Chief of Naval Operations for Air, his has been the responsibility of commanding the Navy's Air Forces.

In July of 1945 Admiral Fitch was appointed head of the United States Naval Academy at Annapolis, where he will undoubtedly play a large part in shaping the future destiny of America's naval air and sea power.

The appointment is indicative of the growing importance which the Navy attaches to the operations of its Air Arm. This is the first time a Vice Admiral has become Superintendent of the Academy; heretofore the appointment has always gone to a Rear Admiral.

Admiral Fitch's portrait is reproduced from an official U. S. Navy kodachrome.

Post-War Aviation

With the closing of the European war, and the growing concentration of all our forces in the Pacific, we can already see clearly how that war is to be won, however uncertain the timing of victory.

Hence news about post-war civil aviation is taking on ever increasing importance. A large part of this issue of Plane Talk *is devoted to plans that Consolidated Vultee has actively in hand, to provide the most comfortable and efficient planes for civilian travel this nation has ever seen.*

Three articles dealing with developments of the near future are of special importance. "The Planes of Tomorrow", by I. M. Laddon, who is Executive Vice President of Consolidated Vultee, tells you the outlook as seen by one of the nation's greatest designers and engineers. "Stinson Means Business" tells you about the new line of airplanes that the company's Stinson Division will make, to meet every need of personal flying. "The Coming Boom in Air Transport," by W. C. Wold, reports on the speed, economy and comfort of the air transport that will shortly be offered you.

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THE PLANES OF TOMORROW

By I. M. LADDON

At left, I. M. Laddon, who is Executive Vice President of Consolidated Vultee Aircraft Corporation.

Above is a drawing of the biggest land-based troop carrier in the world, now under construction by Consolidated Vultee for the Army Air Forces. Called the XC-99, this six-engine ship is a transport version of the luxury liner pictured on Page 9. Both have a wing-spread of 230 feet, are 183 feet long. As a cargo plane, the XC-99 will carry a payload of 100,000 pounds 1,500 miles, with lesser payload can travel some 8,000 miles.

WHEN the Wright Brothers flew the first powered airplane a little more than 41 years ago, they got off the ground in what was appropriately called a flying machine. That was all it was. A machine that flew.

From that small beginning, the airplane has developed into a mode of transportation. Everything done since then in the way of engineering and operations has been aimed at just one primary objective: to make the flying machine a more efficient, and therefore more *economical,* means of transport.

Economical transportation is the result of a balance between load, speed and cost. What is happening to the design of the commercial airplane is comparable to what happened to the automobile.

For instance, the race cars at Indianapolis have just one job: to circle a 2½ mile brick track at high speed. Load carrying ability is not important. Neither is the cost of the operation. If a driver can get a car speedier than any other car on the track, he has achieved economical transportation in terms of auto racing, for he comes in first and wins anywhere from 35 to 40 thousand dollars.

But if that same driver then decided to take a contract for hauling bricks with his racing car, he could not deliver economical transportation in terms of commercial trucking.

What automobile manufacturers have done with the motor car, we have begun to do with the airplane. We are designing in terms of function. We are rapidly making present models obsolete.

Military aircraft are already demonstrating the great diversification that the airplane of the future will amplify. Here again we are faced with the question of building not a cheap plane, but one economical in the fullest military sense.

Since no one can measure the cost of losing a war, the military simply asks the aircraft industry to produce a better plane for each special purpose than any other nation is flying; and to produce it in equal, or greater, numbers.

As the war has progressed we have seen

certain ships specially designed for dive bombing, other ships for low level bombing, still other planes for high level bombing.

Fighters also have become specialized. In the maelstrom of actual combat, all of these planes have performed other types of work. But primarily each military plane is designed today for a specific job, and gives maximum performance on that job.

When it comes to obsolescence, the military plane is even more subject to competitive deterioration than are commercial models.

FROM the standpoint of design engineering, the form of the airplane has been reasonably well stabilized for the past ten years, except as it has been marred by military requirements.

In design, we have dealt with four elements: a fuselage, a wing, an empennage or tail, and a power plant.

We have improved the design of each; we have improved the interaction of each with the others or decreased and minimized their mutual interference. But we haven't discarded any of these on a practical basis.

True, experimental "flying wings" have been built and flown—planes that discarded the tail—and they have achieved a measure of stability.

But the cost has been high. Part of the price paid is in the necessity to more or less freeze the center of gravity. In the "flying wing" you can't carry a mobile load. For either cargo carrying or passenger transport, this is a serious handicap.

The Liberator, for instance, is reasonably stable—that is, it can be flown and controlled within a range of 20 per cent of the average wing chord. This means that you can shift your load around somewhat, if you are carrying cargo, and still handle your plane.

Or, if you have passengers, they can make necessary trips aft occasionally without causing the pilot serious trouble.

But in a "flying wing" everything has to stay put. Small boys, for instance, would be a difficult problem in a "flying wing."

There remains another fundamental about an airplane that we have to remember.

We think of an airplane, for instance, as an air machine. That is only partly true. The airplane is also a land or a water machine. During take-offs and landings the airplane is earthbound.

An airplane then is really a two-element machine. Ground and air.

This matter has an important bearing on design. Primarily we design a plane for optimum performance in the air. But we also have to put on landing gears, and design airfoils and flaps.

Flaps are used on landings and take-offs to augment our lift and increase our drag. Then, when we are airborne, they are retracted to reduce our drag and increase our cruising speed. By means of wing flaps, and various other means of temporarily changing our airfoil, we are able to satisfy both the earth bound and the airborne requirements of design.

To these requirements "something new" is about to be added. I think we may soon have to redesign our airplanes in terms of "sonic and super-sonic" speeds.

I am afraid this is where the trouble starts. For no one, not even among today's aeronautical research engineers, knows for sure what happens when an airplane gets into the speed ranges known as "sonic" and "super-sonic."

All we know certainly at this time is that when an airplane gets into the sonic speed ranges it may take a physical beating for a number of technical reasons. We think that if it could pass into the super-sonic speed range, conditions of reasonably stabilized flow would again prevail.

WE shouldn't have to worry much about these very high speeds except for one factor. After being powered by a reciprocating engine for its entire life span of slightly over forty-one years, coasting more or less comfortably along all this time at sub-sonic speeds, the airplane has suddenly acquired a new type of power plant. This is the gas turbine driving a propeller . . . or the gas turbine operating as a jet propulsion unit.

With this new type of motive power we can attain much higher speeds economically than we could with the reciprocating engine. These speeds offer new problems of aeronautical design. It is likely that the wings on the new airplanes will be much thinner than we now use, and will have sharper leading edges.

When an airplane approaches sonic speed—so-called because it is the speed of sound—strange new problems arise.

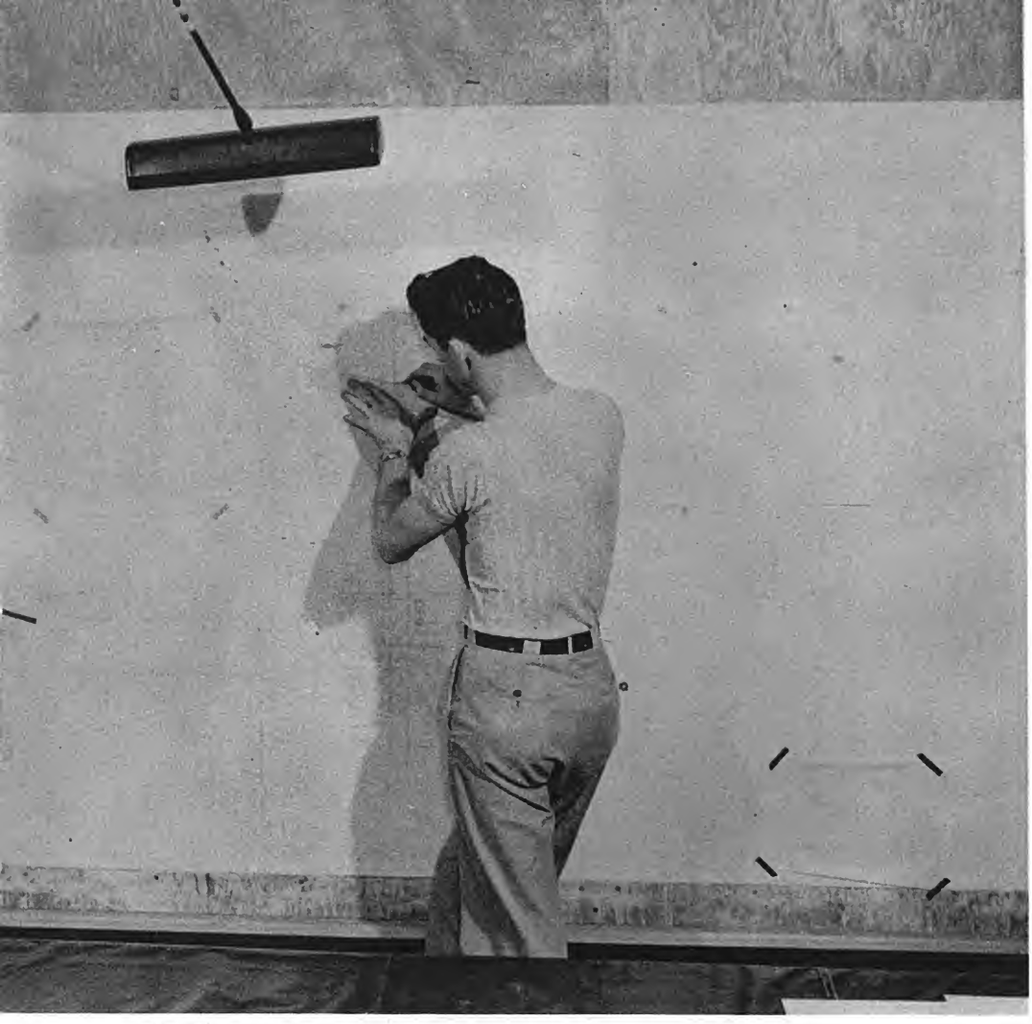
In the loft department at San Diego, Consolidated Vultee engineers make full-scale drawings for the parts of a new military airplane.

While the airplane is flying at today's ordinary speeds, the air flows over and under the wing, around the fuselage and tail, and around the tips of the wing. The flow in general is fairly smooth. If you will think of a boat displacing water at moderate speeds and creating bow waves and stern waves, you will have an analogous picture. The airplane creates many similar waves as it parts the air by being pushed or pulled through it.

Now as long as we fly at sub-sonic speeds this parting and flowing of the air around the aircraft proceeds on a fairly nice and even basis.

But when we begin to approach the sonic speeds we meet a new phenomenon. Instead of the air parting and flowing around the wing, some of it piles up. You can at least *think* of it as piling up out in front, being pushed along.

For those who have had experience with boats, it may be helpful to translate what happens to the airplane approaching sonic speeds into what happens to a displacement boat in the water at relatively slow speeds.



As you know, this piling up action of the water at the bow of a displacement boat begins at very low speeds, and becomes substantial at speeds from 25 to 40 miles an hour, depending upon the lines of your hull.

In hydrodynamic terms this is called the hump. The drag, which starts out by rising gradually, suddenly increases radically as we increase speed. To get only a little more speed, we have to pour in a much larger amount of power.

What is happening is this: the faster we go, the larger the wall of water we are pushing ahead of us and the greater our drag.

Now you who have had flying boat experience know that when we reach the point in our take-off where the drag on the hull is building up fast, we gun the engines and rock the controls a little. By doing this we break through the hump and begin to plane.

We don't know to what degree this analogy holds so far as air is concerned, but we do believe there is some similarity. The early effect is the same in each case—an accelerating increase in drag that appears to extend into infinity.

In the air, from zero miles an hour to speeds below the sonic range, the increase in the drag of our plane has gone up on a smooth easy slant. But when we approach the sonic speeds, that slant suddenly goes up in a sharp curve.

The effect, when you are flying a plane, is described as being like that of hitting a brick wall, and the turbulence of the air buffets our plane violently.

Now no one has yet taken an airplane through this sonic speed range, which is called the "area of compressibility." But we have fired rockets and projectiles that have gone through it and into super-sonic speed ranges.

A rifle bullet and the V-2 rocket bombs, for instance, both travel at speeds much higher than that of sound.

How we are going to get an airplane through that sonic speed wall and into the super-sonic speed ranges, where conditions will get back to a predictable normal, is something we have not solved yet.

We are making experiments in wind tunnels, but for technical reasons they are not entirely satisfactory. It is possible that we shall do our first experimental flying in the sonic speed ranges with pilotless radio controlled planes that will register their instrument findings on the ground.

All of this may seem rather technical, even though over-simplified, but it deserves mention for a most important reason. It shows that progress in the design and production of aircraft is not ending, but just beginning.

We have a practically new industry on our hands today. The excitement of pioneering, the satisfaction of helping to find the answers to new problems, has returned to the aircraft business.

I myself have been in the airplane business almost 30 years. I expect to have more fun building airplanes in the next ten years than I have had in the past 30. The challenge of the unknown in designing and building aircraft was never greater than it is today. The fun is starting all over again.

The gas turbine engine that is forcing designs for super-sonic speeds upon us heralds other changes, too.

For one thing, we are going to have much less vibration in our gas turbine airplane than we have with today's reciprocating engine airplane. That not only means more comfort for the passengers, it also means we can cut down the weight of our airframe and increase the payload.

In addition, we expect the gas turbine to deliver more horsepower per pound of weight than we get out of a reciprocating engine.

Further, the gas turbine operates most efficiently at about 85 per cent of the rated, or maximum, horsepower of the engine—whereas our reciprocating engine operates most economically at about half its rated horsepower, requiring us to use full power for take-off and climb, and then cut back to half throttle for economical cruising.

This means that in a gas turbine engine we don't have to carry extra weight around to get economical high operating speeds.

I don't think anyone knows how far we can go to improve the efficiency of the gas turbine. The engine is too new to say definitely what it will or will not do.

Today we have reciprocating engines that are delivering one horsepower per pound. What we have done with reciprocating engines in reducing weight per horsepower we can hereafter expect to do with gas turbines, which already weigh less than 1 pound per horsepower.

Such new developments in aircraft design and production will make it possible to build great commercial air fleets such as we never knew in pre-war years. And these same developments will make our present military air forces obsolete in five years.

STINSON
Means Business

As the needs of the Army Air Forces decline (Navy demands are still heavy) the Stinson Division of Consolidated Vultee is swinging into the exciting business of planes for personal transportation.

Before this year is out, its new Voyager 125 will be coming off production lines, as the first of a complete line of five different models to meet different flying needs.

This line has been planned to give dealers a range of planes that will reach from a two-place plane of low cost to a junior executive transport with twin engines that will carry five or six persons.

In addition to the four-place Voyager 125, for which specifications have already been announced, Stinson will offer (a) a two-place plane, low in cost, designed for short cross country hops and instructional flying; (b) a three-place plane for more versatile flying; (c) a five-place plane, to be known as the Sky Coach, designed as an ultra modern high speed "plane of the future"; and (d) a twin engine plane which will carry five or six people as a junior executive transport, and will have a performance comparable to that of present airliners.

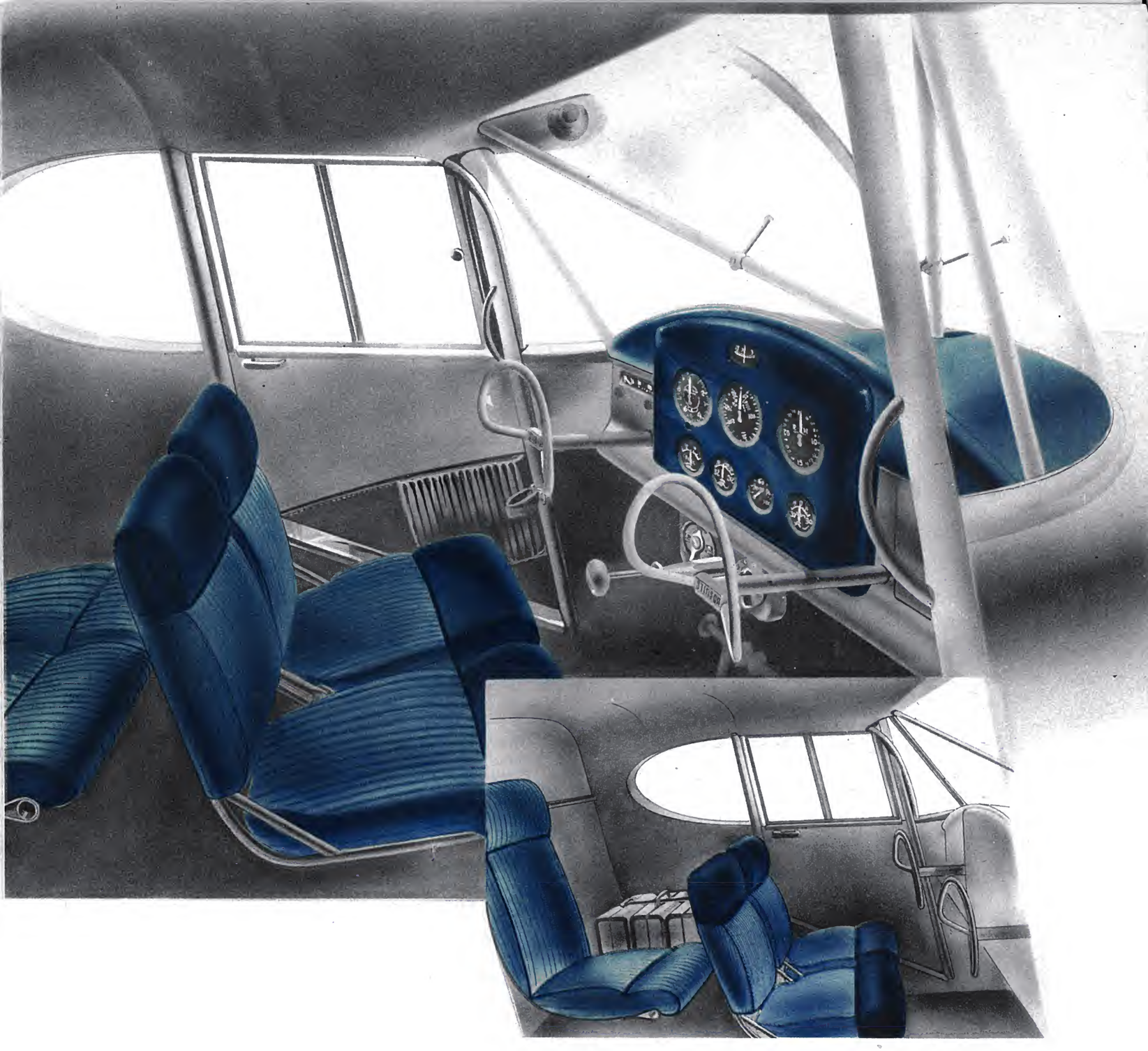
The purchasers of Stinson planes will find Stinson service available wherever they want to go. Every authorized Stinson dealer will be a repair and service representative for the company's products; and plans are under way for creating a dealer organization that will make the servicing and repair of Stinson aircraft as simple as the caring for the family automobile.

Under the "Stinson plan" being made available to dealers, plane parts, instruments, etc. are all standardized, to simplify their procurement and assure a constantly

◀ Left: The instrument panel of the Voyager 125.

available stock. In planning its new dealer and distributor organization, and designing its dealer and distributor contracts, it has been Stinson's aim to create a merchandising set-up that would attract men who are outstanding in ability and enterprise.

Many dealers who sold planes successfully before the war, and who expect a large increase in business in the years just ahead, have been interviewed by Stinson representatives to ascertain their own ideas of what the buying public will want. They tend to rank the factors creating sales ap-



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The new Stinson Voyager 125 provides limousine comfort for three or four passengers, plus ample room for baggage. The plane is now in production.

peal for aircraft in this order: (1) utility; (2) dependability, safety; (3) low maintenance costs; (4) economy of operation; (5) comfort, convenience, appearance; (6) ease of handling; (7) original cost.

Further surveys have established that banks and finance companies are eager for the business that will result from financing sales of personal planes, and there seems no question that future purchasers of such aircraft will have the same financing plans available, and at the same interest rates, long familiar in automobile purchases.

Stinson will offer its dealer and distributor organization a wide range of sales aids, including service and sales training courses; the "Stinson Plan" to be offered dealers is patterned in many ways after the proved operations of the automobile industry.

In foreign markets such as South America the Stinson name is today as favorably known as it has been for years among professional flyers and sportsmen in this country, and plans are being made for production to meet important foreign as well as domestic demand for Stinson planes. In line with these plans, the Nashville plant of Consolidated Vultee was recently assigned to the Stinson division for its manufacturing operations.

The Voyager 125, first of the new Stinson planes to see its specifications made public, will have a maximum speed of 125 miles an hour, a range of 580 miles, and a ceiling of 13,800. As a four-place plane, it is designed as a smart, comfortable and safe air vehicle for a small family which wants low maintenance costs and does not require high speed.

HOW GENERAL PATTON FLEW HIS JEEPS

by William B. Mellor, Jr.

IN newspaper and magazine articles, he invariably is referred to as a "tank commander"—the hell-for-leather old cavalryman who, buttoned up tight in his star-spangled M-4, charges headlong at the enemy and bowls him over by sheer weight of metal and fire power.

But George Smith Patton is far more than that. He is a general who knows intimately every facet of his many-sided war machine: who fights not with iron monsters alone, but with every other arm—aerial as well as earth-bound—which goes to make up the complex army of today.

"Old Blood and Guts," indeed, is one of the most air-minded of our ground generals, and it was to the air that he looked for the protection of the flanks of his long, slender column of armor when he took his 3d Army on its breathtaking dash across France and into Germany.

"Without the close co-operation of General O. P. Weyland's XIX Tactical Air Command," he said afterward, "we wouldn't have dared to leave our flanks hanging in the air, deep in Nazi territory, and our drive might have been stopped far short of the German frontier."

General Patton's reliance on the airplane, however, dates from long before that dramatic episode, for he was one of the first general officers in the United States Army, if not the first, to utilize the lightplane as a means to achieve the spectacular marches and lightning attacks which since have kept his name, and that of his army, blazoned in the headlines.

It was his personal plane, a little Stinson Voyager, which blazed the aerial trail down which thousands upon thousands of flying jeeps later were to wing their way, to create a new chapter in lightplane history.

Patton first used the little craft back in the summer of 1940, to keep a paternal eye on the training maneuvers of his armored brigade at Fort Benning, two years before the field artillery and the Tank Destroyer Command adopted the lightplane for observation and reconnaissance.

Since then the flying jeep has become the Army's aerial handyman, performing a multitude of chores and doing them more efficiently than ever before. In every theatre of war, Stinson L-5's are doing courier service between Army headquarters and front line units, evacuating wounded from jungle airfields too small to accommodate the larger Army planes, carrying mail, rations and supplies to groups isolated behind enemy lines. And it was Patton and a small group of other forward-looking ground officers who showed the way.

General Patton first learned to fly in an old Curtiss Jenny back in 1921 when, as a major of cavalry, he was quartered at the Army Polo Center at Mitchel Field, Long Island, with an Army polo team.

Engrossed as he was then with polo, hunting and racing, however, the dashing young major gradually lost interest in flying, and allowed his license to lapse.

Then came the summer of 1940. Europe was aflame, and it appeared inevitable that America would be sucked into the maelstrom. The War Department sorely needed an answer to the Nazi panzers which had swept across Poland, Holland, Belgium and France. They found that answer in Georgie Patton, who had commanded the only American tank brigade to see action in the last World War, and had been an ardent advocate of armor ever since.

Patton was sent to Fort Benning, Georgia, to help build and train an armored force which could take on the German panzer units and beat them at their own deadly game.

In World War I, Patton had only 157

tanks to look after. In Georgia he was to have under his command 325 tanks, 800 six-by-six trucks, 500 motorcycles, as many half-tracks, 360 peeps, and hundreds of other vehicles. And the tough old cavalryman was a leader who liked to have a finger in every pie. He wanted to see for himself what was going on, not to have to depend on the reports of his subordinates in the field.

Finding it impossible to cover the vast maneuver areas in remote sections of the huge Fort Benning reservation effectively in a peep or command car, he learned to fly again, at the age of 55, and bought himself a "Voyager". From then on, every man in his command was kept on the jump.

PATTON was everywhere at once, with a blistering torrent of profanity for the goldbricker, a helping hand for the novice, a pat on the back for the man that did a little better than his best. It became legendary among his troops that wherever trouble developed, there, in a few minutes, would appear the Old Man, usually skipping in over the tree-tops in his private plane, to straighten things out.

Once, during a simulated attack on a village, which involved a river crossing, one of Patton's units which had received a lively and profane briefing from their hard-boiled commander back at the base, was astonished, on arriving at the river, to find him there ahead of them.

Standing in the middle of the bridge in the cold light of early dawn, he waved them on, shouting "Come on, godammit! Get those tanks across. Hurry, dammit, hurry!"

He had flown there ahead of them in his Stinson to see for himself that his instructions were followed.

Patton's greatest military asset always has been the ability to stamp his men with the impress of his own dynamic personality, and with the aid of his flying jeep, he was able to be everywhere at once during those hectic days of preparation; driving, cajoling, leading. The results of that personal leadership still are to be found in the *esprit de corps* of the 2d Armored, although that division long since was transferred to another command.

When General Patton took his armored troops into the large scale maneuvers of 1941, through the swamps of Louisiana, the mountains of Tennessee, and the pine forests of the Carolinas, his little Voyager went with him, and it wasn't long before he discovered its effectiveness in tactical use, as well as for training.

The General after his return, in June, 1945, to America. In July he went to Europe again.

Unlike the heavier and faster observation planes, which had to stay upstairs to perform their missions, Patton was able in his sturdy little ship to sneak up on the "enemy," flying very low; take a peek at them over the crest of the nearest hill, and speed away, still skimming the tree-tops, before any effective fire could be brought to bear on him. It gave his units a big edge in the war games, and it wasn't long before commanders of other units were utilizing the Stinsons, too.

By the summer of 1942, General Andrew D. Bruce was using them extensively at his newly-created Tank Destroyer School at Camp Hood down on the Texas prairies. Borrowing pilots from the Air Corps to fly them, he utilized the little, slow-flying planes to lead his destroyers across country in search of advancing tank units, and he immediately found them invaluable for that mission.

Soon every branch of the armed forces was calling for lightplanes. General Jacob Devers wanted them for all his tank units. Lieutenant Colonel J. C. L. Adams, an infantryman, wrote a complete manual for their operation, and visualized them as replacing gliders in air-borne operations. The Field Artillery adopted them in the winter of 1942 for observation.

General Patton sold his "Voyager" before he embarked for Casablanca in October, 1942, but after the North African coast was secured, he had several Stinson "Flying Jeeps" shipped to him and used them in Tunisia, Sicily and in Europe. In the fall of 1944, when his 3d Army had run right off its tactical maps in its dazzling dash across France, it was a lightplane which carried a new set of charts to the stalled columns of armor.

One day, just before the 3d Army smashed into the German Westwall fortifications, General Patton witnessed a startling demonstration of just how valuable a lightplane can be. Standing on a hilltop, the General saw a B-26 crash behind the German lines on a shell-pocked field where no plane could have landed safely. But one did.

The pilot of a cruising lightplane also saw the B-26 go down, so he dropped in too, while only a few hundred yards away German soldiers were rushing to capture the bomber's crew.

The little observation plane picked up the co-pilot of the bomber, bounced across the rough field, and got into the air just before the Germans arrived. After dropping his passenger safely behind the American lines, the courageous pilot rounded up six other flying jeeps—and the seven fliers, armed only with .45 automatics, started back to try to rescue the rest of the bomber's crew from their captors. They turned back, however, when the commander of the B-26 waved them away. All of the fliers later were recaptured by armored units of the 3d Army.

Today, there is hardly a military use to which the flying jeep has not been put. But it took a tanker to learn their capabilities, and to make of them one of his most valuable weapons.

Left, the new Model 39 of Consolidated Vultee, in use by American Airlines to conduct a new cargo experiment. The plane has been carrying between East and West coasts cargoes as various as fresh fruits and vegetables, a load of 60 gas ranges, a 9¼ ton load of plane parts. *Business Week* has heralded the project as "a surprise performance . . . spectacular." The fuselage, 15 inches above the ground, facilitates truck loading.

THE COMING BOOM IN AIR TRANSPORT

Rates will come down and speeds go up; you'll get an unprecedented service.

By W. C. Wold

No one can look into the future and say what the volume of transcontinental passenger traffic will be in the postwar era. But we can find out how many people have been traveling from coast to coast in the past, and find logical reasons why more will do it hereafter, and why more of them will do it by air. We can then predict with some assurance the effect of these factors upon postwar transcontinental air traffic.

The war has enabled aviation to gather the momentum which might have required at least ten peacetime years. Thousands in the services have traveled throughout the world by air — thousands have had their lives saved by nothing more than the speed of air transportation — and to many thousands more in the Army and Navy Air Forces, flying has become a business. These men and women, many with hundreds of flying hours to their credit, are returning to mingle with their families and friends; and, they are bringing their aeronautical nonchalance with them. Man's inherent gregariousness, and his desire to keep up with his brother, will do the rest.

The increased size of aircraft is itself another favorable factor in stimulating air travel, for it does much to eliminate fear. The fear of flying is not simply the fear of height.

To be strapped in a seat in a relatively *small* vehicle, then taken to great heights in vast spaces, is a combination of mental hazards stronger than many people can overcome. Just as people who wouldn't put one foot into a rowboat think nothing of spending several days in the Queen Mary, those who wouldn't approach a "Cub" will nonchalantly fly in an airplane like Consolidated Vultee's Model 37, in which they can walk up and down stairs and roam around. They will feel secure, that is, in such an airliner in the company of two hundred or more fellow travelers taking the same "risk"—in a plane where the words "comfort", "luxury", "convenience", and "transportation" overshadow the word "flying".

The increased speed of tomorrow's airplane is another favorable factor. Transcontinental air service today is far from bad. One airline recently inaugurated a schedule which cuts the coast to coast trip to about fourteen and one-half hours elapsed time, two hours and forty minutes faster than anything we have had so far. It still means that a busy New York executive cannot spend a full business day in San Francisco, for example, without spending the better part of another day in travel.

Compare such an operation with that of Consolidated Vultee's Model 37, which Pan-American will use, at a block speed for a non-stop 2500-mile hop of 320 mph. That's an elapsed time of well under eight hours. When our busy executive can pass his normal sleeping time in transit, spend a full business day in San Francisco, then use his normal sleeping hours again to return to New York in time for the next full business day, transcontinental air traffic should show a marked increase.

Lower costs are going to build future air traffic, too. Remember the economic truism that market volume varies inversely with price; and the aerodynamic corollary that cost decreases with aircraft size.

The reasons are not too obscure. Volumetric capacity of a plane varies as the *cube* of its linear dimension, while fuselage structural weight varies roughly as the *square.* Therefore, the larger fuselages give us a higher ratio of volumetric capacity to fuselage weight. Airplane capacity by weight, of course, depends upon the percentage of the gross weight which is available for power plant, lifting surfaces and useful load. Hence the larger airplane, with its greater useful load volumetric capacity, has more of its gross weight available for power, lift, and useful load.

Of course, if the larger wings and power plant cost us relatively more weight, we wouldn't be getting anywhere. But they don't. As almost everybody knows, the weight cost of aircraft engines, in pounds per horsepower, has been decreasing steadily with increased power output. Further, the trend toward higher wing loading is decreasing the pounds of wing weight per pound of load carried. This all adds up to *more* payload, carried *farther,* for less quantity of airplane.

Maintenance costs are proportional to the quantity of airplane being maintained. But crew costs and several other factors have a negligible increase in comparison with increased airplane size. So we keep getting more and more for less and less. And the limit is not in sight.

A great many people believe that the land plane will reach its limit before the seaplane, because of the problem of landing facilities and landing gear structure. But in either case the limit is not easy to predict

This is Consolidated Vultee's Model 37, the passenger transport version of Model XC-99 pictured on Page 1. It will carry 204 passengers, will fly from New York to London in about 9 hours. Pan American World Airways will use a fleet of these monsters. The plane requires some 4,350,000 man-hours to build, will have every luxury, including hot and cold running water. Use of helium instead of air in the huge tires will save 154 lbs.

when you consider that we already have in construction in San Diego the Army's C-99 —a land plane weighing twice as much as the largest land plane yet flown, and for which few landing fields of sufficient length and strength have yet been constructed.

It is evident then that we are facing an era of larger and faster airplanes, which will tend to reduce the cost of traveling by air with a resultant increase in traffic.

The fare from San Francisco to New York, as this is written, is $159.68 by air, $142.00 by Pullman, $70.00 by rail coach, and $52.00 by bus. *But the direct flying cost of a full load transcontinental flight for the six-engined Model 37 is $10.85 per passenger.*

Now don't think for a minute that $10.85 is all you'll have to pay to travel from the West Coast to New York. There's a little matter of indirect flying costs to be added to that figure, which in present-day airline operations amount to about 200 percent of the direct flying cost.

But for the sake of speculation, let's double our calculated direct flying cost of $10.85 to be conservative, and add as much again for the indirect costs, on the assumption they may not decrease as anticipated; and then let's say the airplane never averages more than three-fourths of a load of passengers. That still adds up to a cost of only $86.80 for the transcontinental air trip — a figure that is coming. It won't be next year, or maybe in two years. But it's a certainty.

It is easy to think of the factors that will increase our transcontinental travel, but to evaluate them is another story. Here are the figures for the average daily passenger traffic between the two busiest pairs of transcontinental air terminals:

Terminals	*Daily Air Passengers**	*Daily Rail Passengers***
New York and San Francisco	76	140
New York and Los Angeles	65	123

*From CAA Research and Analysis Division Reports Origination and Destination Airline Traffic Survey for 73 Selected Stations, August 17 to September 13, 1944. (Fractions omitted.)

**1/365th of the estimated number of rail passengers for the year 1940, from Table 12 of "Initial Study of Air Transportation", by the Association of American Railroads, January, 1944.

They are not very impressive figures, are they? But for every one of these seventy-six existing daily transcontinental air travelers, don't you think there might be in the post-war era another prospective customer who will have overcome his fear of flying? Or another one who desires the speed of air transport, combined with the comfort and convenience of his former Pullman? Or another who just couldn't afford the price of air transportation in 1940, or even 1945?

Well, I believe there are lots of people in each of these categories.

Let us project ourselves into a day in the future. Make it a nice spring day between one and two years after the close of hostilities. You are a buyer for a big merchandiser of women's style clothing. One of the country's top dress designers is having a style showing in New York tomorrow. You reach in your pocket and pull out a time table which looks something like this:

	Leaves S. F. (PT)	Arrive N. Y. (ET)	Leave N. Y. (ET)	Arrive S. F. (PT)
Trip 1	2200 (10 pm)	0900 (9 am)	1200 (Noon)	1700 (5 pm)
Trip 2	1200 (Noon)	2300 (11 pm)	0200 (2 am)	0700 (7 am)

Then you say, "If I take Trip 1, tonight, I can see the whole style show, place some orders, spend the whole evening around New York, and catch Trip No. 2 back in time for the next morning's work."

Such a schedule is based upon an eight-hour elapsed time, which is possible with a plane like Consolidated Vultee's Model 37, cruising at 340 mph. It provides one arrival at each terminal at a reasonable hour at the beginning of the working day.

The time zone differential is a little factor which prevents transcontinental scheduling from being too simple. It makes an eight-hour trip *appear* on the time table as eleven hours Eastbound, and five hours Westbound.

That simplified schedule suggested here is one that will furnish two transcontinental flights each way every twenty-four hours, and requires only two airplanes to be in the air sixteen hours per day. Designers and operators both anticipate an overall airplane utilization of eighteen hours per day will be attained in the postwar period. In comparison, the schedule shown above is conservative from the standpoint of utilization, since it can be maintained by a three-plane fleet averaging a utilization of only 10.6 hours per day per airplane.

So you can certainly look forward to service like this, from the standpoint of schedules.

So much for passenger traffic. What about cargo? It is my opinion—although many do not agree—that we are about to enter a transition period regarding the relative importance of cargo and passenger traffic. I believe that it will not be many years before airline operators, and our whole industry, as a matter of necessity, will place cargo traffic foremost in our thinking, and will consider traffic a secondary source of revenue.

An indication of this trend lies in statistics recently released by the C. A. B., showing that airline revenue from express and freight sources increased 107 percent from 1942 to 1943, and from 1938 to 1943, 2870 percent.

The trend is clear. Hawaiian Airlines, for instance, carried nearly seven million pounds of air cargo during 1944, which is a 25 percent increase over 1943. Nearly one-third of the total poundage was in fresh fruits and vegetables.

This last spring saw the beginning of full planeload shipments of perishables from California's Imperial Valley, when an American Airlines DC-3 stopped at El Centro to pick up six thousand pounds of tomatoes for delivery to Cleveland markets the following morning.

The Department of Agriculture, in conjunction with the Edward S. Evans Transportation Research, has made several studies of the marketing of perishable produce by air, considering such items as strawberries, tomatoes, and lettuce. Pan-American Airways has recently joined United Airlines and the A & P Tea Company in a research project on the air transportation of perishables being conducted by Wayne University. Braniff Airlines and Chicago and Southern Airlines have announced a 30 to 40 percent reduction of air express rates on perishables.

The annual convention of the United Fresh Fruit and Vegetable Association, held this year in Chicago, devoted an entire day to the problems connected with the use of air transportation in their business.

These are just a few air cargo news items. All over the country interest is growing in airborne perishables. The word "perishables" isn't confined to fruits and vegetables. Any commodity which has a high rate of decrease of market value with time is a perishable.

The long list of such items includes daily newspapers, weekly magazines, drugs and medicines, motion picture film, dresses, shoes, and all forms of style clothing, popular phonograph records, and sheet music.

One of the big problems in cargo transportation is to get a good payload for the return trip. It's fairly easy to get a full load going one way, but you double the cost if you have to fly back an empty airplane. It is fairly well established, at least in my mind, that Southern California contains the West-to-East, steady, payload potential to make air transport of garden perishables a successful proposition, if only we can be sure of the East-to-West backhaul.

Research has disclosed that a seventy-five percent backhaul payload for at least three airplanes per day of the current airline type is already assured from the city of Detroit alone.

Clothing from the big style centers in New York, fish from the Eastern seaboard, meat from the big packing houses, and magazines from the Eastern publishers, are some of the potential backhauls which are being investigated. Each commodity or type of business we attempt to take into the air brings its own particular problems, solution of which often leads one far afield from aircraft design—into marketing, packaging, distributing, and other phases of American business life. A few years ago we didn't realize these fields would concern us.

From my contact with men in the fields of growing, packing, shipping, distributing, and selling food products, I am learning some interesting facts. Take lettuce for example: In passing from the grower's garden to the consumer's table, it goes through four price mark-ups, at least one of which may be eliminated by air transportation. If garden produce is maintained at a temperature between 36° F. and 42° F. during transit, it is unnecessary to freeze or even to ice it.

TRANSCONTINENTAL cargo traffic has its future in three main categories of service.

First comes the normal common-carrier type of service, which includes air mail, the Railway Express Agency's "Air Express", and the new, slightly slower, but cheaper type of airline cargo service, like American Airlines's "Air Freight".

This common-carrier type of service, for all practical purposes, is available to anyone for shipping anything. Naturally, because it involves individual shipments of non-uniform cargo to varying destinations, it is the most expensive form of air cargo. Air mail, as you know, costs eight cents an ounce, or $1.28 per pound. It would cost $90.00 to air mail a seventy pound package (the maximum weight permitted) across the country.

"Air Express", which is an extension of the familiar Railway Express service into the air, will handle any shipment whose size and weight will fit the dimensions and flooring strength of the aircraft involved. Unlike air mail, air express varies in cost with distance as well as weight. To air express seventy pounds across the country would cost about $60.00.

The Air Freight service operated by the airlines themselves is a bid for larger volume shipments. American Airlines "Air Freight" has four rate classifications, depending upon the value and the density of

the cargo, with minimum quantity shipments of certain commodities allowed under these rates. For example, Air Freight's Class D Rate, which includes cosmetics, machine parts, and printed matter in fifty pound minimum packages, enables you to ship seventy pounds from Los Angeles to New York for $31.60.

Now even $31.60 is a prohibitive cost for shipping a seventy pound crate of lettuce to New York, no matter how crisp and tasty it may be upon arrival. But that difficulty brings us to the second main category of postwar cargo traffic which we may anticipate: The Contract Carrier. Suppose you buy a fleet of airplanes and make a deal with me to haul all the lettuce I raise from California to specified markets in the East, and another deal in Philadelphia, for example, to haul mushrooms or magazines on the way back, for a rate of, shall we say, fifteen cents a ton-mile. That is known as contract carriage, in contrast to the various forms of common carriage, which render a service to all comers.

You see, with a setup like that, where you've got plenty of available payload in full airplane lots, and you know where it is, and where you are taking it, you have about the most streamlined air cargo operation possible. You are not taking off and landing every two hundred miles, loading and unloading a few packages here and there, with all the personnel and red tape necessarily involved. Your indirect costs are at a minimum. Consequently you can afford to charge a far lower rate than the common carrier.

Fifteen cents a ton-mile is not a far-fetched rate for such air cargo transportation, especially if you use a large four engine airplane. At that rate, the seventy pound crate of lettuce would be flown from Los Angeles to New York for just $13.10.

That is still costly lettuce. But at the Fresh Fruit & Vegetables Association Convention in Chicago, considerable discussion among airline officials resulted when they learned that airplanes are at hand with which they will show a profit at rates in the vicinity of five cents a ton-mile. I believe that such rates are attainable. The quickest way to get them is to start people talking and thinking of such possibilities.

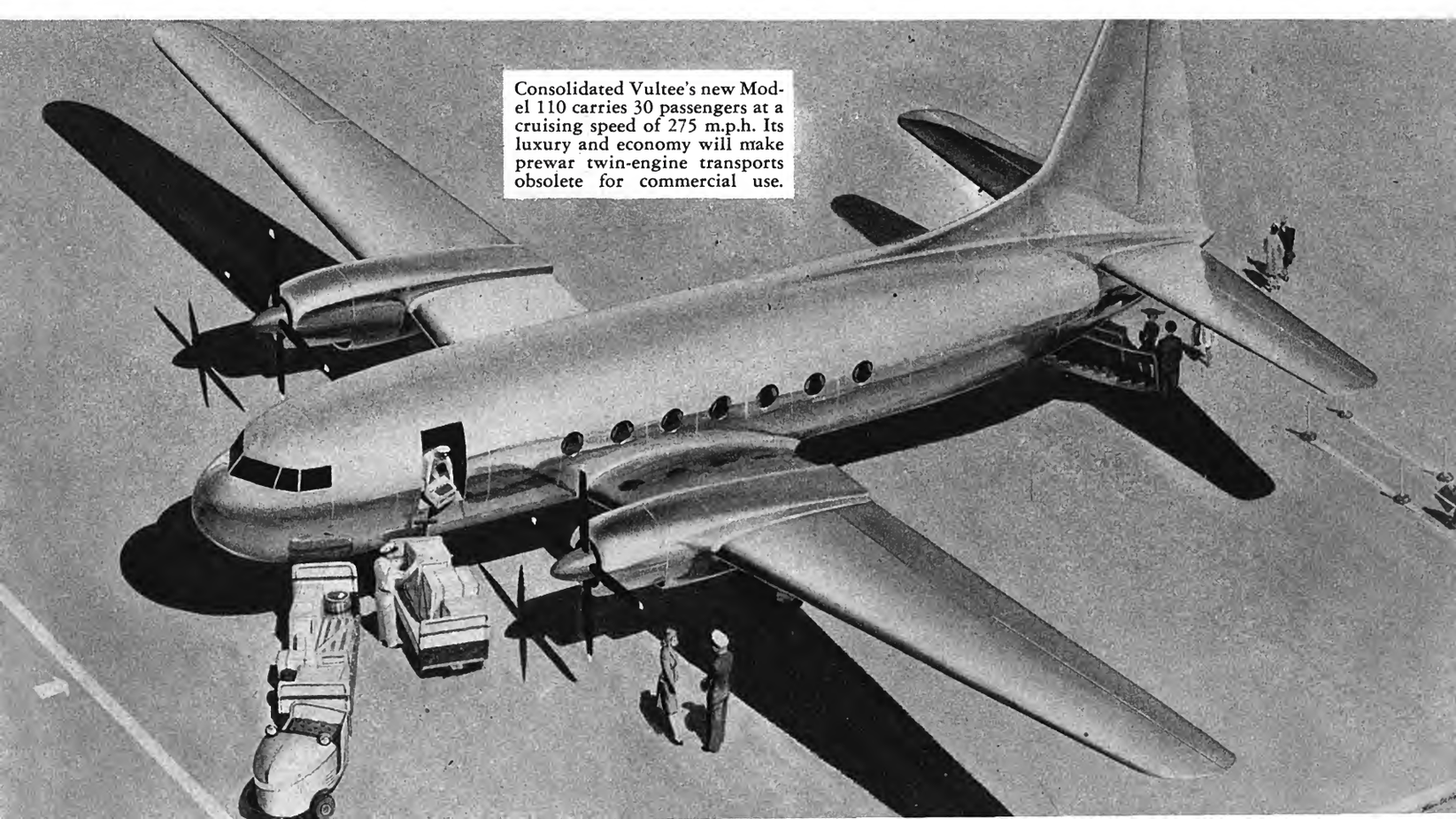
In talking about passenger traffic, I mentioned a direct flying cost of $10.85 to carry one passenger twenty-five hundred miles. *That is a direct cost of only a little over four cents a ton-mile.* It is based upon a luxurious version of Consolidated Vultee's Model 37, which naturally has a low ratio of payload to weight empty. When we get around to tearing out all the excess weight of structure and furnishings, and make an all-cargo version of this airplane, we anticipate almost doubling the payload. This, of course, will halve the ton-mile cost. The time is not so far off when we can afford to fly lettuce, after all.

Now, of course, if you're going into this contract carrier business to haul my lettuce around, you probably expect to make at least ten percent on your money. If I think I am a big enough operator and have enough loads of lettuce to send to New York and Chicago every day, I may decide to save that ten percent myself. I will buy my own airplanes and fly my own lettuce to market.

This constitutes the third category of air cargo traffic which we may anticipate — ownership of fleets of airplanes by business organizations whose size can make it profitable.

The pattern of regulations which will govern various forms of air transportation is being considered by the Civil Aeronautics Board.

Whatever the outcome, let us hope it favors the good old American competitive system. If the American competitive spirit is given free rein, I know we have enough capital, and enough aviation-minded business men in this country, to create a demand for air transportation and aircraft manufacture that will keep America the strongest country in the commercial aviation world. There is no better national defense we could build.



Consolidated Vultee's new Model 110 carries 30 passengers at a cruising speed of 275 m.p.h. Its luxury and economy will make prewar twin-engine transports obsolete for commercial use.

APPLYING OUR EXPERIENCE TO JAPAN

by Captain Arthur Settel

THE European battleground, 1940-1945, has been a schoolroom for Generals, and the lessons learned, particularly with respect to vertical warfare, are already being applied against Japan. Theories of warfare are so far ahead of World War I strategy that celebrated campaigns such as Tannenburg, the Marne and the Aisne, Soissons, Vaux and Douaumont and the Somme, seem as remote as the adventures of Alexander the Great.

What have these lessons been and how will they hasten the conclusion of the great contest with Japan? How have our Air Forces benefited to the same purpose? These are questions being answered on the Islands of Iwo Jima and Okinawa, in the skies over Nippon, along the traffic lanes of the East China and the Yellow Seas, and through the plains and mountains of southeast China.

Pan-Germany and Japan have been as alike in ideology as they are different geographically. Both have been autocratic states controlled by the fiat of a handful of men following identical patterns of conquest by invasion—partly for the sake of national glorification, partly for the loot to be stolen from occupied countries, and partly for strategic advantages. Ruthlessness and fanaticism, and greed for territorial aggrandizement, are characteristics almost universally ascribed to both peoples.

In point of geographical advantages, size, shape and depth—factors which count so heavily in military strategy — Germany differs from Japan as greatly as the United States from the British Isles. These differences must be kept in mind if the gigantic operations now being mounted in the Pacific are to be understood.

An accident in history placed Germany in a central position on the continent of Europe, making possible her exploitation of the raw materials of weaker neighbors concurrently with the full-scale development of domestic mineral reserves.

Although smaller than the State of Texas, Germany was in the front rank of machine-age states, became almost entirely self-sufficient in food production, exploited to the maximum her rich coal resources, developed short lines of communications, and inflicted upon the world a mobile army which was thought to be unbeatable.

Japan, in contrast, consists principally of four large volcanic islands—Honshu, Hokkaido, Shikoku and Kyushu — and several hundred smaller islands stretching into an arc to less than 200 miles off the continent.

Japan's past immunity to invasion can be ascribed to the historic isolation of the islands, which lie north of the main Southwest Pacific trade routes, and to the country's natural poverty throughout most of its 148,000 square miles — an area almost exactly the size of Montana.

Unlike Britain, with isles centered in the world's great land masses, and provided with readily accessible bases for land-based aircraft, Japan sits on the edge of the vast Pacific on one side and close to impoverished China on the other. All these factors make Japan extremely vulnerable to the kind of war in which America has perforce learned to excel.

The first principle of our successful offensive operations in the Battle of Japan consists of building up, first, our air superiority—which we had already achieved by early 1945 in the Central and Southwest Pacific—and then our air supremacy, which we had clearly established when our Navy shelled Jap cities in July with no opposition whatever.

An enormous four-pronged aerial claw consisting of seven air forces is now poised to beat down the Jap in what is already one of the fiercest struggles of all time. These air forces are our Alaskan-based 11th, stabbing at the Kuriles in the north; our Guam-based 7th, striking from the east; our Marianas-based 5th and 13th, lunging from the southeast; and our China-based 14th, attacking the enemy from the west in China.

Added to this accretion of power is the combined might of the 20th Air Force, consisting of the 20th Bomber Command (until recently based in India) and the 21st Bomber Command, now dropping veritable avalanches of fire upon Japan's industrial cities. In addition, there is our 10th Air

This watercolor by Captain Norman F. Todhunter, AC, shows Liberators of the 14th Air Force, which has been in China since the war's early days.

Force, which formerly operated from India against Burma targets and is currently on the move to other unspecified areas, Eastward. Every one of these striking forces, including the 21st Bomber Command, has been employing B-24 Liberators along with other types of air power.

And, as if this gigantic accumulation of striking power weren't enough, the seasoned bombardment groups of the great strategic and tactical air forces in Europe, which brought Germany to her knees, are being retained and redeployed at rapid tempo, to be added to the present order of battle in the Pacific. By the time this is read, the 8th Air Force will be operating over Japan under General Doolittle.

Hence the sum total of American air power which has now been set in motion against the Far East enemy staggers the imagination. Its weight of missiles will soon dwarf the 2,878,000 tons of destruction hurled upon vital objectives in Europe by Allied bombers.

Our campaigns in the Orient promise to be more decisive and our armadas far more concentrated, if for no other reason than that our airmen are wiser, our planes bigger and better, our devices vastly improved, and our early mistakes eliminated. What we have learned in Europe will undoubtedly hasten our victory over Japan.

OUR air superiority in the European Theatre was reached early in 1944, when Goering's hottest pursuit planes, the Focke-Wulf 190's and the Messerschmitt 109's, found themselves wholly unable to drive off the vast fleets of Liberators and Flying Forts surging in from the west and south on their double-barreled mission—destruction of Germany's war industries, and annihilation of her armies and weapons of war.

Our complete air supremacy in Europe was achieved only a few months later, well before our June invasion, when armadas of more than 1,000 four-engine bombers, escorted by nearly as many fighters, were able—at any hour of day or night and in good weather or bad—to attack any point within Germany or the German-controlled continent.

The great versatility of the Liberator as a weapon of total war was first demonstrated on this European proving ground. As a heavy bomber, it dropped 450,121 tons of explosives on the German enemy, or 28 percent of the AAF total. It went out on 224,892 sorties. Liberator crews destroyed 2,617 planes in aerial combat, damaged 1,703 and destroyed 352 others on the ground.

It further proved itself as the number one espionage agent: Liberator aerial reconnaissance, developed into a fine art, brought back enemy intelligence of priceless value. It proved itself as the number one quartermaster supply medium: in aerial transport it was matchless for its speed in the delivery of supplies to our own lines and behind enemy lines. It proved itself as one of the world's greatest weapons in psychological warfare: in leaflet dropping it carried the truth to captive nations, refuted the enemy's lies, and even reached into the minds of German soldiers.

The "24" likewise proved itself as a tactical weapon of extraordinary possibilities, both before and after our Rhine crossing.

In retrospect, our air campaign against Germany seems to have progressed with breathless speed. It was in 1943 that our 8th Bomber Command first went out after ten German key industrial cities which,

because of their importance to the aircraft industry, were given high target priority.

Ball bearing plants, steel producing centers of the highly developed Ruhr triangle, and aircraft assembly and component plants, were reduced to rubble. Between June and October, 1943, Germany was deprived of a thousand pursuit planes which were never built as a direct result of these bombing assaults.

In close coordination with the RAF, Lt. Gen. James H. Doolittle's 8th and Maj. Gen. Nathan F. Twining's 15th Air Forces so thoroughly destroyed major factory complexes in Germany and Austria during the "Big Week" of February 20-26, 1944, that production of enemy fighter planes was cut 75 percent. The result was that Germany was in no position to replace her losses in aerial combat, was impotent in the teeth of the relentless hammering from the skies, and could offer only spasmodic counter-efforts.

Not only did we destroy German planes; we even more effectively destroyed Germany's facilities for fueling them.

The selection of Germany's oil-producing and gasoline storage centers as our top priority target, one particularly assigned to the 15th Air Force Liberators, is regarded by many as the masterpiece of Allied strategy in the Battle of Europe. A mobile army is paralyzed without fuel for its planes, tanks and armored vehicles. The comparative scarcity of petroleum in Europe added to its attractiveness as a point upon which to bear down.

Our large-scale assaults on oil began in earnest in April, 1944, and gained momentum after D-Day. In May, synthetic plants in Saxony, northeastern Germany, the Balkans and Czechoslovakia, were attacked by the AAF. In June the RAF Bomber Command took on the ten oil plants located in the Ruhr, beginning with the four largest, which together produced a third of Germany's synthetic oil supply.

While days were long, the Bomber Command visited plants in western Germany and the AAF plants farther east. Later, as the days grew shorter, the RAF struck at the more distant targets and the AAF joined British planes against the Ruhr.

In the meantime, fleets of 15th A. F. Liberators were busy reducing German oil sources in Rumania, Hungary and Austria, and a series of synthetic plants in Czechoslovakia, Poland and Germany proper. Great oil industries at Ploesti, Brux in the Sudetenland, Blechhammer and Odertal in German Silesia, Oswiecim in Polish Silesia and Ruhland south of Berlin, were torn asunder and rendered practically useless by such a storm of explosive devastation as the world had never seen.

No single bombing campaign has been so complete in its effect as this attack. But for this strategy, the Germans would have been able to fight a war of movement on many fronts. As it was, so little oil was being produced in Germany in April, 1945, that the small amount could not be efficiently distributed—it would have taken too much oil to move the remainder to where it was needed most.

Before the campaign began, Germany had a normal monthly output of 1,344,000 tons of all oil products, and 532,000 tons of motor and aviation fuel. By September, 1944, the output of oil was down to 310,000 tons, 23 percent of the original figure. By April, 1945, it was down to 7½ percent of what the output had been a year before.

Germany's capacity for a war of movement was further reduced by what our Air Forces did to her railroads. The immense destruction inflicted on the rail network of northwestern Europe by the flying artillery of Gen. Hoyt Vandenberg's 9th Tactical Air Force has set the pattern of things to come in Japan.

Take one instance. Two Panzer divisions sped across Germany in 72 trains, each division traveling on three lines with 12 trains on each. When they arrived at Nancy, they found they could only get from there to Paris at the rate of 8 trains per day instead of 72. A part of the two divisions pushed onwards to Paris in their 8 trains that day. But the remainder, the greatest part of the force, detrained and made the rest of the trip to Normandy by road. Setbacks like this made Germany's case hopeless. Indeed, it has been stated flatly by German industrialists that their nation's principal difficulty in the last year of the war was transportation. The Jap transportation complex is even more vulnerable.

ONE of the fundamental lessons which our bombing experts learned on the scorched lowlands of Europe was the inter-dependence and co-equality of land power with air power, neither being an auxiliary of the other. No important plans were drawn for ground, sea, amphibious or air operations without the full participation by Air Force experts in discussions which preceded them.

AAF Kodachrome

In Europe, our airmen have pioneered in the science of keeping up with a front moving with the speed of an express train.

Thus the four-engine battle fleets of our 8th Air Force in Europe could be switched, seemingly without preparation, from flying long-range strategic missions against remote targets deep inside of the Reich, to making hops against tactical objectives such as enemy pockets at Falaise, along the Seine, along the Loire, or in the Ruhr.

The power of the modern combat airplane to isolate a battlefield was further demonstrated conclusively in Europe by our 9th Air Force, which consisted of a bomber command and three tactical commands charged with the mission of searing a path through enemy defenses for the advancing Allied ground forces.

A basic principle of Allied strategy was implemented when on July 18th, 1944, an armada of 1,056 Lancasters and Halifaxes of the British Bomber Command, 570 Liberators of the 8th Air Force and 318 mediums of the U. S. 9th Air Force, attacked enemy defense positions and concentrations of armor less than an hour before the advance of our armies to the east of Caen.

The same technique of heavy bomber preparation was employed by the 8th Air Force in bombing ahead of the First Army

Streaks from the wing lights of 7th AAF Liberators in the night skies of the Marianas Isles.

at St. Lo. A short time after the Air Force attacked, ground forces surged forward to pave the way for the armor to break in, drive into Brittany, and knife across France until it paused outside of Metz six weeks later.

Such technique carried us eventually straight into the heart of Germany, in a total victory that came less than a year after we actually landed our troops on a continent presumably defended by the greatest land power in the world.

Jap warlords who might still entertain any doubts as to what the future holds in store for their own misguided country, should consider the final box score on combined AAF and RAF operations in Europe. A preliminary review shows a total of 2,878,000 tons of bombs dropped; 3,688,000 sorties flown and 50,891 enemy planes destroyed.

The AAF, which was in combat for 41 months, dropped 1,555,000 tons of bombs, or 54 per cent of the total, and destroyed 30,152 aircraft, or 59 per cent of those knocked out in combined Allied effort. The cost to America of strategic bombing by the AAF against the Germans was between 23 and 24 billion dollars, or less than one-tenth of the 244 billion U. S. war cost up to January of 1945.

THE basic weakness of the Jap defense lies in the dispersion of her forces over thousands of miles and their inability to negotiate a five-front war. What Northern Italy, the Balkans and Norway were to the German High Command, the scattered Pacific Islands, Southeast Asia, the Philippines and East China are to Japan.

Japan's weaknesses in material resources make her vulnerable, too.

Pre-war she imported vast amounts of war material from England and America. But Japan has not been able to replenish her existing stocks from such Anglo-American-Dutch sources since Pearl Harbor. Hence she is dependent heavily upon the treasure house of raw materials in her ill-gotten empire, of which Indo-China, Thailand and Burma are the granary.

But our present position in the Philippines and Okinawa now enable us to blockade Jap supplies from the south. Of the 6,400,000 tons of Jap shipping which she owned or captured since the beginning of the war, 2,140,000 have been sunk by the AAF alone. Army and Navy joint operations have deprived the enemy of more than 21,000 planes in three-and-a-half years of fighting.

Thus Japanese transport problems make her far more vulnerable to our air attack than a continental power like Germany ever could be.

At that, the whirlwind of our air power is really only beginning to close in.

It took Great Britain three years and the United States two years to mount the first 1,000-plane bombing assault on Germany. In contrast, the 21st Bomber Command, which employs B-24s as well as 29s, and has been established in the Mariana Islands less than 12 months, already drops bomb loads 30 per cent heavier than the 8th Air Force's record total for any single raid.

Interestingly enough, it has been suggested, without official corroboration, that careful study of the effect of earthquakes furnished the evidence upon which the AAF has modified its bombing from the pin-point methods used in Europe to the saturation fire-bombing technique being employed against the Jap home islands.

All this is only the curtain raiser. With each successive American air assault, an average of 100 planes are being added to our attacking force. It has been estimated that 2,000 Very Heavy Bombers and other four-engine types could soon be based on Okinawa. One cannot comprehend the inferno they will leave in their wake.

As we proceed, the lessons we learned in Europe are being well applied.

The Jap fleet can still strike out in waters which are protected by land-based aircraft. And the Jap Air Force, despite its losses, is still a powerful defensive weapon near home bases. Japan has stock piles estimated to be good for another year of total war. Further, Japan still has a 4,000,000 man army, a fourth of them deployed in South Formosa and China. Two or two-and-a-half million men at home are eligible for military duty. We have not yet come to grips with this force.

But we have the forces and the material now in hand to outmatch anything Japan can possibly show. Even more important, we have accumulated invaluable experience.

As General George C. Kenney said in late July: "When this force is turned loose against Japan, something has got to give. We expect our troops will go ashore anywhere with almost total lack of opposition as they walk up the beaches."

The greatest lesson we have learned in the European proving grounds is the vital importance of coordinated attacks by ground, sea and air forces, working in equality and interdependence. Doctrines which have been forged in the flame of Europe's battles are to guide the great operations being mounted for the subjugation of our Japanese foe. There may be some doubt as to the duration of this struggle. But on the question of its final issue there is none.

STRIKE at the Lifeline

THIS is a reproduction of an official U. S. Navy painting, a water color by Lieutenant Dwight Shepler, which shows a Navy Liberator making a strike at sea against an enemy submarine.

In this war American airpower has written a new kind of history in nullifying the enemy's efforts to interfere with our own shipping, and in imposing—conversely—a blockade on the enemy which steadily withers his resources.

Japan, as an island power, is far more susceptible to such a blockade than Germany ever was. For while Germany at the height of her power had access by land to the resources of a major part of Europe, Japan can only replenish her island stores by tortuous trips across water.

Navy Liberators have been blasting Japanese shipping out of the Pacific ever since the early days of the war. Some extraordinary feats have been reported. For instance, a Navy Liberator piloted by Lieutenant Arthur G. Elder of Dallas, Texas, was credited in June with sinking or damaging the enormous total of 68,395 tons, in a series of Pacific searches that the Navy described as a "three-month rampage." The total damage inflicted by the plane broke the previous record of 63,850 tons set by Captain Norman M. Miller, in his famous Liberator "Thunder Mug."

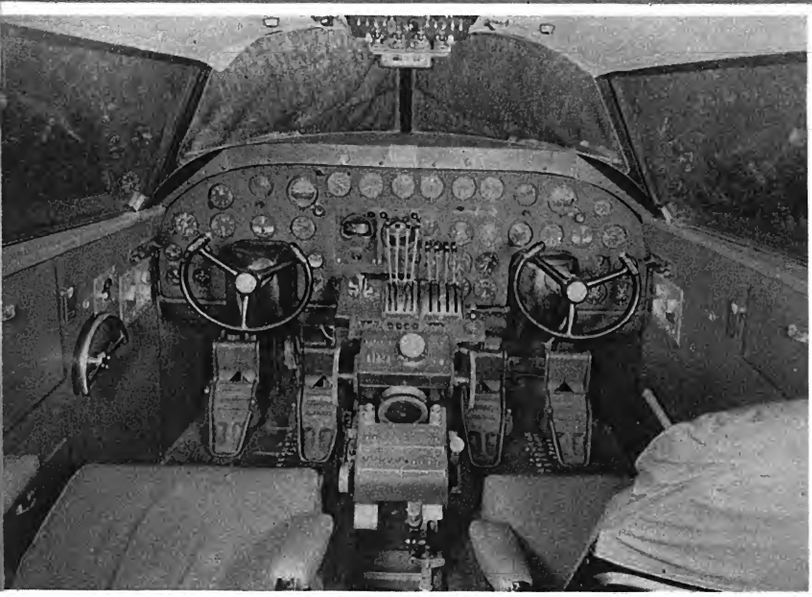
Whereas the Army speaks of its Liberator B-24 as a bomber, the Navy calls its Liberator PB4Y a search plane; the B-24 goes on "missions," the Navy Liberator on "searches." It is not uncommon for these great Navy planes to make hops of from 1,600 to 2,000 miles over Pacific waters that are heavily patrolled by Jap fighter planes, in quest of enemy shipping that can be attacked.

Jap ships are sought in their ports, as well as at sea. One Navy Liberator, for instance, recently flew a round trip to Singapore, covering more than 2,000 miles; in the Singapore harbor, bombs were dropped from a level of 100 feet on Jap transports anchored there. The Liberator, despite injuries from anti-aircraft fire that knocked out one engine and destroyed half its tail, got safely back to base. As a result, this plane, commanded by Lieutenant Frank H. Cutaiar of Kennett Square, Pennsylvania, was credited with making one of the "longest three-engine flights" on record.

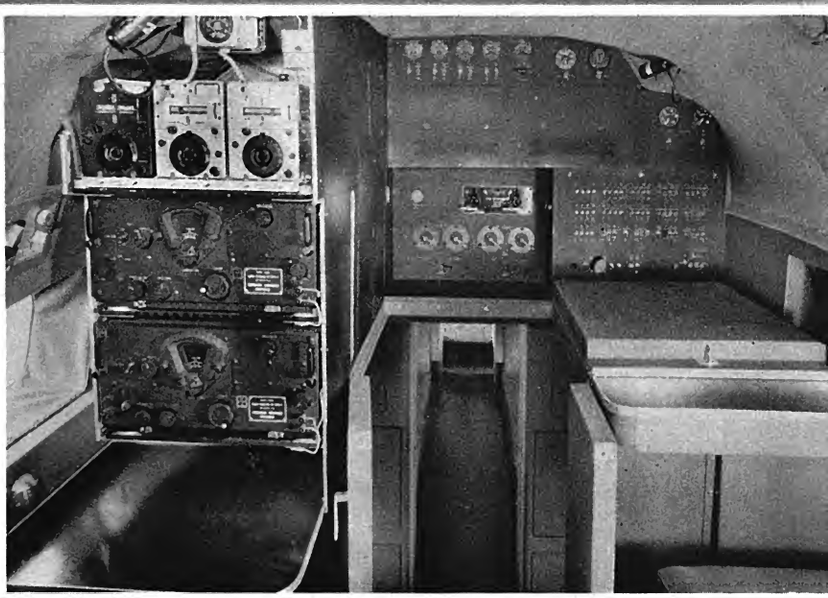
These Navy search planes are usually lone wolves. They go out over vast areas of ocean space alone, and they fly without fighter protection, having to rely on their own speed and firepower for defense against enemy attack.

The newer version of the Navy Liberator has been given a single tail, and is known as the Privateer PB4Y-2. But the older PB4Ys are still in service, too, and their gallant crews are bleeding the Jap strength away along all the ocean lifelines the enemy has been using for transporting his troops and supplies.

The huge windows, six feet long and 1½ feet high, are made of ⅜-inch Plexiglas. Special fuselage construction was required to make these windows possible.



Above is the flight deck, with pilot's and co-pilot's instrument panel. Front windows of this enclosure are ½-inch tempered glass.



Above is the Navigator's compartment, with open door. The plane has the most modern mechanical improvements, including a heat anti-icing system.

Below is the lounge, upholstered in green leather; in the background is the passenger compartment. Seats make up into berths.

Below is the plane's writing compartment. At every seat, oxygen outlets are provided at the top of the window, and a small spotlight for reading.

Seats have removable tables, ash trays, built-in magazine racks.

Seats make upper and lower curtained berths, 8 feet long.

A Liberator De Luxe

This is not a plane of the future; it's the XB-24 — first Liberator ever built by Consolidated Vultee. Long graced with the name "Grand Pappy", it was recently converted into a transport plane for use by the AAF in carrying high officials on long flights. Its numerous innovations make it the most luxurious wartime transport in existence, and its comforts would surprise many a combat crew who flew in to B-24s the hard way. The conversion work—the special pride of F. A. Learman, who is general sales manager of Consolidated Vultee —was done by the company's Flight and Service Department, of which R. R. Rogers is director. A. C. Bussy, chief of Air Transportation, was directly in charge of the alterations.

Above: the leather and dural lavatory. Below: the galley compartment, with hot and cold water, stove and refrigerator.

Entrance to flight deck, showing leather upholstered bulkhead.

Larry Keighley Kodachrome

Liberator landing under a tropic moon on one of our Pacific islands.

FINDING the WAY

By Lieutenant Robert M. Lambe

PLAYING a vital part in the Pacific wing of the AACS is a Liberator that performs a task vastly different from the one the engineers originally designed her for. Affectionately known as "Bucket of Bolts", this Lib has the job of keeping constant check on the communications facilities and radio aids to navigation operated by the AACS in the Pacific.

The AACS is the Army Airways Communications System. Every pilot dreams of the day when he can't get lost, when he'll always be on a highway in the sky as well-defined as the Harrisburg-Pittsburgh turnpike. With each passing day, the communications facilities operated all over the world by the AACS bring that dream closer to realization.

Old "Bucket of Bolts", sans turrets and guns — thereby becoming a "Fat Cat" in Pacific air lingo—makes up for her lack of armament by the hodge-podge of radio equipment she packs. She's capable of tuning in practically every radio navigational aid in existence, and many an hour is spent aloft carefully checking the legs of a radio range, the power of a homing beacon, the speed and efficiency of a direction-finding network.

In the Pacific the AACS mans the system that's known as JACSPAC—Joint Airways Communications System-Pacific — and it serves Navy and Marine flyers as well as

the AAF. Navy Privateer and Coronado patrol bombers, no matter how far they are from land, rely on ground stations, homing beacons and D/F nets of the AACS in covering their search areas.

Lt. John Fouts, AACS Detachment Commander at Peleliu Island, recently received a commendation from Admiral Nimitz for his outstanding services in "keeping cleared vital movement reports of exceptionally heavy Marine aircraft traffic, far in excess of the normal capacity of his unit."

But AACS is far more than a Pacific Service. With redeployment from Europe now in full swing, the North and South Atlantic routes are handling the greatest mass of flights of aircraft in history. Over 50,000 men a month are being flown back to the United States, along with the veritable flood of combat aircraft.

To handle this increased aerial traffic, 4,000 additional flights are being made across the Atlantic each month. That means a flight every ten minutes. Add to this the bombers and fighters of Lt. General Doolittle's Eighth Air Force, which have been redeployed to the Pacific, and you see how the radio trails in the sky now resemble the Indianapolis Speedway.

To the AACS men on the ground this means millions of words of radio messages and position reports from airborne operators, millions more radio-telephone conversations between pilots and control tower operators, and constant electronic tracking by Direction Finding Nets. These have been instrumental in the saving of many lost aircraft. They work in conjunction with Air/Sea rescue units, and on many occasions have directed rescue units to within a few miles of the spot where a plane went down.

The Direction-Finding networks that are offering such world-wide guidance are each composed of three or four stations scattered over an assigned area, providing electronic fingers that point the way to a plane that's lost, pin it within a few miles of its position, tell the pilot where he is and where to fly.

Indicative of the kind of "saves" made by the D/F net is the story of a B-24 that took off from Newfoundland for a routine flight to the Azores. The ship was buffeted by high winds and adverse weather conditions. Some thirty minutes after the time the ship was due to arrive the D/F station in the Azores received a call from the plane's pilot saying he was lost, and requesting a bearing. The lone D/F station "shot a bearing" on the plane's radio signals and gave the pilot a new course. The wind was still high; bearings were necessarily taken with regularity. Every few minutes the ship would be given a new course to steer.

After four hours of constant tracking by the D/F station, the Lib finally sighted the Azores and came in for a landing exactly four hours and 37 minutes late. There was only enough fuel left for a very few minutes' flight.

Skipping many time zones away from the Atlantic, you find AACS men operating in skyways over the Hump the radio navigational aids that lay tracks in the sky similar to the layout of a well organized railroad. There are mainlines and spurs, marshalling yards and controllers. The sky engineer pilots his plane along a predetermined course on regular schedules over many such different "tracks". In peak periods AAF planes pass over the Hump only 3½ minutes apart.

In the circle, high near the mountain top, is one of our Aleutian weather reporting stations. The men who operate it change shifts every four days, need three hours to reach the base in the valley.

AAF Photo

FOUR and a half years ago AACS was an infant offspring of the AAF, with only 350 officers and men. Today the organization numbers well over 40,000, scattered in a thousand detachments the world over.

Its first task was to establish the necessary communications facilities along the North Atlantic in the pre-Pearl Harbor days of 1941. Since then the expanding air routes of this global war have put AACS men in vital spots all over the world. On the Arctic Circle in Greenland and Alaska, for instance, AACS men operate weather reporting stations, and millions of words of weather information are handled daily over the AACS networks.

One of the newer radio aids operated at airports throughout the world by AACS is the Instrument Landing Approach System. At fogbound airstrips this series of devices provides a pilot with a radio signal that lines him up with the runway, and a bent glide path that guides him down through the "soup" to the end of the runway, making possible landings that would otherwise be suicidal.

Perhaps the most glamorous of the varied tasks performed by AACS men is the operation of control towers all the way from

Germany to Iwo Jima and Okinawa. Often times these men must work under enemy fire.

For instance, the control tower operators and ground station men landed on Iwo Jima on D-Day plus nine. There they learned to play "Hop-Scotch Through Hell" as they dived from their 17-foot control tower while Jap shells landed around them more often than planes.

At Tacloban airstrip on Leyte, AACS men in a control jeep managed to get a Navy frequency and brought in over 200 Navy planes from baby carriers that were under attack. All during the confusion of planes landing on a runway pocked with shell holes, the Japs kept up constant air raids. At Myitkyina, Burma, AACS operators were among the first to land to direct the traffic of the airborne operation. They set up shop in a foxhole, since the Japs didn't agree that the airstrip had been "taken". Continued artillery, rifle and machine gun fire fell on the field. And once in Southern Burma a Lieutenant in charge of an AACS team, while giving a plane its landing instructions, calmly told the pilot to standby and circle the field, while he meanwhile picked up a rifle, potted a Jap sniper on a ridge overlooking the field, and then told the pilot he was clear to land.

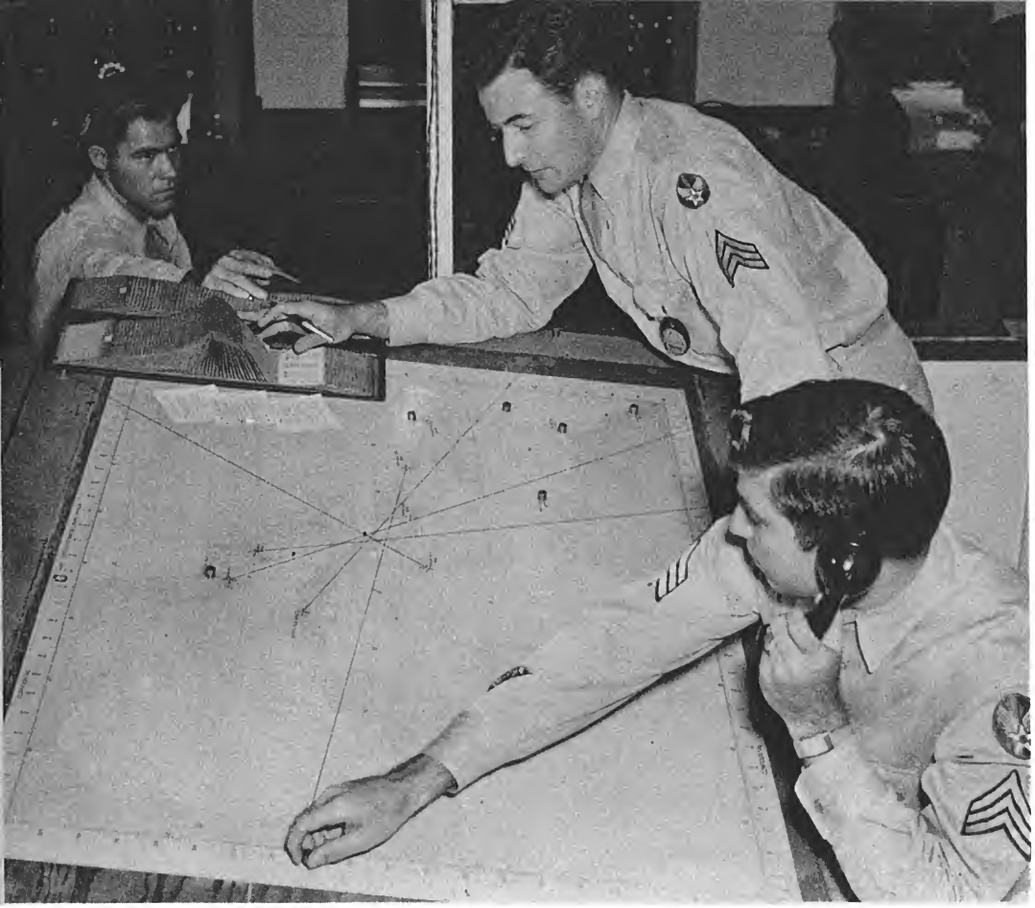
At Saipan, B-29s returning from the first mission over Tokyo were scheduled to land at the rate of one a minute. The big boys, low on fuel, gave control tower operators a fit as they roared into the landing strip only 20 seconds apart. For the Japs hadn't quit their "nuisance" raids and there was no time in 20 second intervals for the AACS men to seek protection by making long leaps to the ground from the control tower. They finally built themselves an "elevated foxhole" on the tower catwalk, putting extensions on their headphones and mikes, in order to control traffic while peeping over sandbags.

This is the JACSPAC installation on barren Christmas Island in the Pacific—one out of thousands

BEHIND these "hot-spot" instances lie cold statistics of the AACS that provide an index to the might of American air power. Aside from its watch over combat aircraft, the AACS saw 560,000 tons of America's high priority cargo, mail and passengers moving through the heavens in 1944. Over 700,000 wounded men were moved by air from battlefields to field hospitals and back to the United States in that year. Every fifteen minutes a military plane took off to cross the Pacific. In providing communications for all these planes, the men of AACS transmitted more than 6,000,000 words a day. More than 50,000 contacts with planes in the air are made each day by ground operators, and control tower men give over 250,000 landing and takeoff instructions every 24 hours.

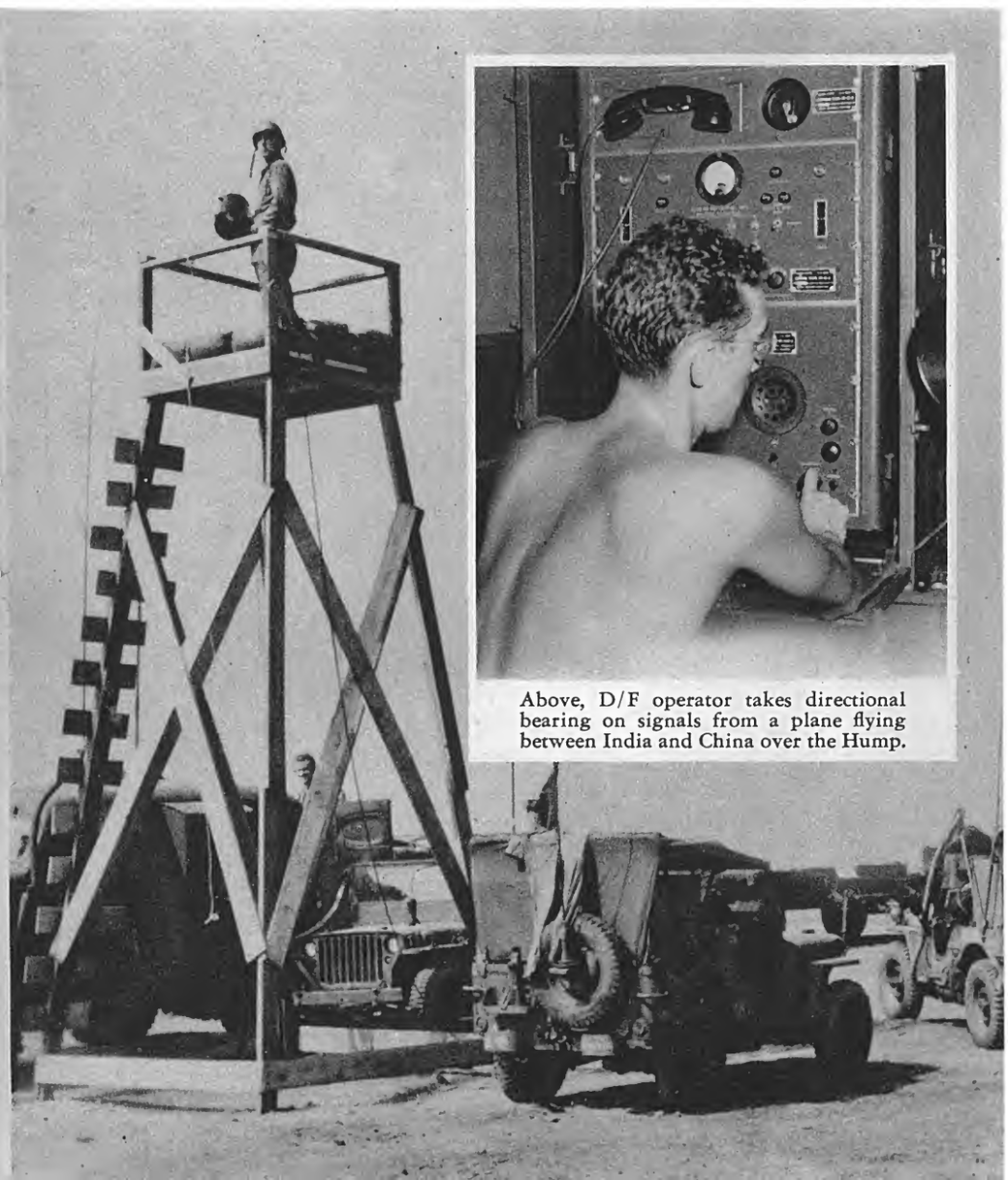
Typical control tower at U.E. Army Air Base.

With the ever-increasing array of air power that is now converging on Japan,



Above, operators answer a plane's query, "Where am I?" by plotting on a board the bearing obtained by several different stations in the D/F net. A position fix can be gotten in four or five minutes. Below, the first tower erected at Iwo Jima, built by SeaBees under enemy shelling.

Pictures on this page are from official AAF photos



Above, D/F operator takes directional bearing on signals from a plane flying between India and China over the Hump.

the AACS men in the Pacific will find themselves deluged with air traffic. The air routes will be extended. New control towers will go up as the AAF and the Navy stretch northward. Ground stations will be in contact with many more planes than ever before. Literally millions of operational messages will have to be flashed from base to base, advising a station that a plane is coming or that one has landed.

As the tempo of air bombardment of Japan is stepped up, the direction-finding men will assist more planes back to base, the control tower men will issue instructions by the second, and ground station operators will be in constant contact with their counterparts in the air.

All this means that business for planes like "Bucket of Bolts" is picking up. They will have many more navigational facilities to check, many more stations to cover. The 7th AACS Wing ranges from Honolulu to Okinawa, making all stops in between; and its men, specialists all of them, are ready to provide the utmost in flying safety through communications.

The men of AACS fight a special kind of war. Some of them dodge mortar fire with Marines, some sit 14,000 miles from the nearest battlefront, many are just "Mister-In-Between". World Headquarters of AACS —formerly at Bolling Field in Washington — are now at Asheville, North Carolina, where the operational, personnel, maintenance and supply operations of the whole system are concentrated under Brigadier General Ivan L. Farman, who commands this global nerve system of the AAF.

Below: A foxhole installation, during invasion.

TILL THE BOYS COME HOME

by Fred B. Barton

YOU'RE sitting in the NCO club at an airbase named Snetterton Heath, England. It is part of Lord Albemarle's hunting preserve, if you care to know. King George V used to hunt here. About you is the English countryside.

These bomber bases—there are dozens around here, one an average of every 9 miles—are set up in old schools and golf courses and potato fields. The layouts are so camouflaged with their yellowish-green paint, the buildings so squat and so dispersed, everything is so utterly casual and unimportant that, even with censorship restrictions removed, you can't make an exciting picture.

These lads around you in flying jumpers are aerial gunners, members of combat crews. That stuff in the white pitcher is British mild-and-bitter. It doesn't foam—it tastes like something from a discontented brewery. There'll be buns and toasted cheese at 21.30, so wait around. Look at the murals: not as nude as you'd expect. Place of honor goes to a triple panel of stenciled bombs and dates, recording bombing missions, painted on the wall around the unused fireplace.

You find these GIs human, friendly, cordial—and trained in the British school of understatement. Profane they are. A lad with feather-down on his chin uses words a mule-skinner would blush at, uses them naturally. "Doesn't mean a thing," said feather-down. "Do you think when I go home I'll say to my mother 'Pass the blanking butter?' My father would break me in two."

A staff sergeant with enough Hershey bars on his right sleeve, each for six months' service, to start a piano keyboard tells of a trip he made to Linz, Austria, to pick up a plane-load of Kriegies — Americans who were German war-prisoners. He found himself giving them his cigarettes and candy-bars and anything else he had brought along for himself, so needy and appreciative were they.

The sergeant with the flak crease along his right cheek tells you about his own battle injuries, and how the medics back in the States will perform that final plastic surgery job on him when the time comes for his discharge. Meanwhile, he can eat, can't he? Nothing to worry about except a few good looks, and they don't help your night's sleep any.

The lad from Brooklyn tells you without apology that he doesn't care for flying except when it helps win the war. "I put in my combat missions, or as many as fitted in before the war stopped," he says. "I never complained then. But right now I have to put in four flying hours a month to get my extra pay, and I tell you I do begrudge those four flying hours. I'm sick of the air."

Look around the group. You miss a few faces, if you ever visited this B-24 base before. That noisy, cheery lad from New England, whose outspoken ambition was to go back home and be elected sheriff of Woonsocket, got shot down over Hanover. That chap from St. Paul with the artist's genius burning within him like a fire is God knows where. That frightened little lad who was sole survivor of a crew of ten and felt the finger of death upon him when we drank beer together at his base in December 1943 — what happened to him? These men helped pave a road of safety that you and I will travel whenever we fly hereafter from London to Marrakech and Casablanca, or take ship from Southampton to New York, or go anywhere in this saddened but Hitler-free world.

THESE fellows in the Air Forces have had plenty to do while waiting for what's called Re-deployment. For instance, they have been conducting Cook's tours over Germany, to show the rest of the Army how victory looks from the air.

For two years thousands of GIs had been flying a monkey-wrench or a mimeograph or a sentry-post. But finally the MPs, the bedpan commandos in hospitals, the cooks, and airplane mechanics came in for their reward.

"We've flown Congressmen, Members of Parliament and newspapermen over

Germany," said the brass hats. "But we don't really know anyone we love as much as we love you fellows. Now it's your turn."

Stripped of their bombs and waist-guns and with extra K-rations aboard, the heavy bombers were loaded up with ground crews and took off. For some of these landsmen it was their first, or nearly their first, air trip. For all of them except the skeleton crew of four or five (pilot, co-pilot, navigator, radioman, and engineer) it was their first trip over ex-enemy targets.

I went along on one of these educational tours to learn how they were run. The projected itinerary was spelled out for us on a mimeographed map handed to each GI passenger as he boarded the plane. Our Liberator flew our crew of uniformed sightseers over Essen with its ruined Krupp works, over Munster's shattered marshalling yards, over the bombed Dortmund-Ems Canal, then on to Hanover with its rubber factory now in ruins, its gun factory and tank works as flat as Hitler's grave.

Kassel, Frankfurt, Koblenz, Cologne—spelled Köln by the Heinies—passed below us in review as our plane floated along at heights from 200 to 2,000 feet and tried its best to explore exciting targets for eye and camera.

"See that bridge with the tall stone towers?" shouted a non-com from Texas. "That's Remagen. Remember how the Yanks sneaked across there without warning and made their crossing of the Rhine weeks ahead of schedule?" You couldn't miss that bridge.

"Golly," said a thoughtful sergeant from Vermont. "It just came over me that we have seen only two railroad trains all day. Life in this huge country of Germany is completely paralyzed." This Vermonter had sweated out two years in the control-tower of a heavy bombardment base, had seen combat-wounded planes limp home and blow up in emergency landings, had seen planes take off and never return. He had known death, but now for the first time he saw what war really meant, and he was awed.

It was a long, hard, tiring journey: 9 to 10 hours. It struck us as the world's most stupendous show—one which had cost billions to stage—billions of dollars, and incalculable human misery. None of us had ever seen a destroyed nation before. And of course there has been no such destruction in the whole time of written history.

Some of the passengers were fascinated. All were impressed. And some, let it be stated truthfully, were airsick. Maybe it was due to flying low over cities with hollow walls and uncertain air currents, and the weather was not Hollywood stuff, either, for those making their first trip up. Said one groundsman with determination, "This flying, you can have it."

And the pilots and navigators and GI engineers grinned back cheerfully: "This is nothing. Y'ought to fly 8 hours on oxygen, with icicles hanging from the relief-tube."

Back over drab, colorless Germany with its monotony of slate roofs they flew us, and then over Holland, colorful with its dykes and windmills and roofs of red tile. It made a ghastly, impressive, memorable experience for these men, who with typewriters and oil-cans and stew-kettles and all the other sundry equipment that goes to make up a fighting unit had helped fight America's air war. This Cook's Tour was their billion dollar reward.

These tours were so universally popular that it pains me to report they have now been discontinued. A while ago an 8th Air Force public relations officer told me, "We've flown 37 per cent of our personnel over Germany already and we mean to make it 100 per cent."

It was only a dream. And why have these sightseeing rides, these trolley runs, been stopped? Simply because they proved unsafe. Too many pilots got gay, swooping low to buzz a bombed city, flying incautiously between cliffs overhanging the Rhine. Men just ready for a furlough home or a discharge on points were killed in peaceful flying, the victims of a show-off pilot.

"Aerial hara-kiri," growled many an executive officer as he read the report of these one-way trips.

You can't discipline a pilot who has committed suicide and taken a crew and 15 passengers to heaven with him. But the 8th Air Force acted promptly to discourage future buzzing—i.e., swooping low to wave at, flirt with or signal to somebody on the ground. A couple of Saturdays ago a captain buzzed a rest home—a rest camp for combat-weary flyers. Fine: $1,200 and a summary court-martial record against him for all time. A lieutenant buzzed an airfield. Fine: $700. A major got a little gay with government property. For him: $2,400 fine as a souvenir of his childish ways.

"Got to convince these flyers they can't act careless with their passengers' lives and a quarter-million dollar plane," say the air chiefs. They are right. Risk your life in war, if you must; trade life-for-life with the enemy when it pays; but don't kill yourself and wreck your plane by showing off. Kid stuff it is, certainly. How persuade such pilots to grow up?

Too bad that the lesson has to be taught at the expense of ground crews who had counted on their own Cook's Tour and now presumably won't get it. It remains that the

Liberators arriving at Bradley Field, Connecticut, with officers and men being redeployed from Europe. The group in the foreground is waiting to go through Customs as another plane lands. *INS Photo*

Ground crews still in the European theatre enjoy comfortable quarters while they wait.

Here is one of the "private" shacks built by a Sergeant from discarded waste materials.

• • •

This hut has plexi-glass windows, wash basin, and a chest made of ammunition boxes.

concept behind these tours seems to me one of the finest pieces of educational work that our Air Forces have hit on yet.

How about the cost of these Cook's Tours?

Major B. E. "Shorty" Fulton of Akron, Ohio, himself an airman and more recently a Kriegie, says, "These men have to put in their flying time. So we just charge these trolley runs up to training. It is a tremendous morale builder." He thought a minute, then added: "I wish we could fly every man, woman and child in Germany over their bombed-out country. It would teach them a lesson."

HERE in England and throughout France, Belgium and the Continent the 8th, 9th and 15th Air Forces and the fighter groups have been re-appraising their losses. On the unfinished pages labeled "Regensburg Mission," "Mission over Hanover" and dozens of others, entry after entry read: "10 of our bombers are missing," "15 of our bombers are missing, 150 men unaccounted for." And so on.

But fate has been kind. Corrections can now be written in, in the form of real-life Kriegies reporting back from the German prison camps.

Heavy bombers of the 8th Air Force have flown thousands of war prisoners, our own as well as French and British, out of Austria and Germany toward home. You rejoice that these bombers are so roomy and so safe and dependable.

Talking to the Kriegies gives you new ideas on the war.

A Lib navigator fresh out of a Stalag tells me, "These Russians are not a bad lot. Tough and disciplined, of course. If a Russian officer has occasion to kill an enlisted man, he can do so and merely make out a report. We aren't used to that. They like Americans. Maybe it is the generosity of our lend-lease. Maybe it is the way we fight."

And meanwhile, talking with infantrymen on leave in London you get a new insight into the never-changing German psychology: the gimme-all and get-back-nothing technique of life. Says an infantry captain: "These Germans are an incredible lot. They start screaming before they get hurt. They insist they are being abused. In cities that have been bombed they are fairly human and respectful; easy to deal with. In cities that haven't been touched, like Heidelberg, they are still so arrogant that you practically have to ask their permission to walk on their sidewalk."

Men in the 8th Air Force have no illusions about the job of supervising Germany. You can sign up for either the occupational air force or the Pacific, if you belong to this bomber outfit—the 96th heavy bomb group, this happens to be.

Maybe you think the majority of the pilots and aerial gunners and the rest are asking for Germany, which is comparatively quiet and safe. You're wrong.

"Once you get the thrill of combat in your veins you don't want a quiet job," a staff sergeant who is waist-gunner on a heavy bomber explained to me over a rare glass of bottled lager.

Of course, they'd like to go home first, home on leave. But a lot of them aren't counting on that.

It may be flippantly out of place to include here a statement from a native Briton, but the censor permits it, and so I dare the Mrs. Grundys. Three Limeys came into the guest quarters of this airbase this morning while I was typing. We exchanged a few remarks. I mentioned, "the Yanks will soon be moving out."

"But not all of you," said one of the painters cheerfully. "There'll be a lot of young Yanks coming along, for a long time to come." He made a gesture indicating steps, as of growing children.

He went on: "England is the great melting-pot now. Czechs, Poles, Canadians, Americans, and every other race, have left their mark. White *and* black." He thought a moment. "A good thing, too, probably. England was growing kind of stale"—he pronounced it "style." "Now we've got all this new blood over here. It ought to do us good."

Not all sociologists are so cheerful, so content with what they find. I hope, as you too would hope if you were here to observe and to listen, that the final results of having outfits such as America's 8th Air Force stationed here in UK all these long years will be favorable. Adding new blood to England's stock was not one of the purposes of the war, but it is a real result. May all our other acts, and the uncalculated events that send results rippling until the end of time, prove likewise wholesome and beneficial.

GAS FOR CHINA

By Lieutenant Rus Walton

AAF Photo

Above, a Liberator flies the treacherous Hump with its load of gas. Now we have a pipe-line to help do this carrying job—it was completed last June 7 from Burma into Kumming, and carries about a quarter of the oil and gas being shipped into China. The rest is still carried by plane.

THIS will be another routine mission over the Hump, be one of the many flown everyday; its successful completion is taken for granted.

There will be no briefing by intelligence; each pilot knows — from experience — all there is to know about the route. There will be no fighter protection; each unarmed C-109 tanker-transport is expected to accept its odds on the chances of interception. There will be no rest, no relief until the eighteen or more hours of flying are completed.

It is two o'clock in the morning. Silently the rain drips from the eaves of the straw roof, settles in fog. A cup of coffee at the mess hall, then you make the fast ride to the operations building for the clearance and necessary papers. Maps . . . radio frequencies . . . reports on enemy action . . . weather . . . parachutes . . . gun . . . furlined jacket . . .

The ship is ready to go; the liquid cargo is already in the great tanks, weighting her down until the nose wheel almost rubs against the wheel-well, and the tail skid comes close to dragging the ground. Hauling gasoline seems like an inglorious task. But those thousands of gallons of high octane fuel will fill the tanks of some fighter plane or bomber on its missions against the Japanese. It is a heavy load; the plane will strain on the take-off.

Rain beats steadily against the glass. Radio reception is bad tonight, and the wind is blowing in strong gusts across the runway. The tension starts even as the engines are run up for their pre-flight test. Number four spits, sputters and then holds. Probably some rain-water in the carburetor.

"694 . . . cleared to take off." Slowly the plane swings out onto the runway and lines up with the lights. Now it's up to the crew. These boys seem young for all this responsibility, but they have proved themselves many times before.

The runway is more than a mile long; in this fog and rain only a hundred yards of it are visible. The engines surge, the ship jolts and begins to move. Tires squeegee over the wet surface, landing lights poke into the haze and the wind grasps at the wings. Above the roar of the four supercharged engines and the propellers, the co-pilot reads the airspeed aloud. "Sixty . . . seventy . . . eighty . . . ninety . . . ninety-five." Slowly, hesitating at first, the nose wheel leaves the ground and then the main gears follow, skip once or twice lightly before drawing themselves outward into their wells. The landing lights fold back into the wings and the fog closes in against the cockpit.

Everything inside is in complete darkness except for the soft bluish glow of the fluorescent lights and the amber reflection from the radio operator's desk lamp. It must be so to afford the pilots maximum visibility. Maps are seldom referred to, radio facilities are memorized to keep use of flashlights to a minimum.

Most of the flying is done on instruments. The crew chief has cracked the bomb bay doors, to prevent any accumulation of gas vapors which might cause an explosion when ignited by a spark from the radio sets. If that happened, goodbye.

As you watch the pilots and the glow of light on their instrument dial, you become hypnotized and drowsy. You look away to break the trance. The pilots have a trade secret. Always alert, watching every flicker, every deviation of the dials, their eyes are constantly roaming, never concentrating too long on any one instrument. This is important.

The first stop is made to take on gas and oil before jumping across the Hump. Planes start with full tanks to leave the greatest possible off-load in China, where it will do the most good. After a quick check on the weather and another cup of hot coffee, you're back in the cockpit. This next hop is the thousand-mile hop across the Hump.

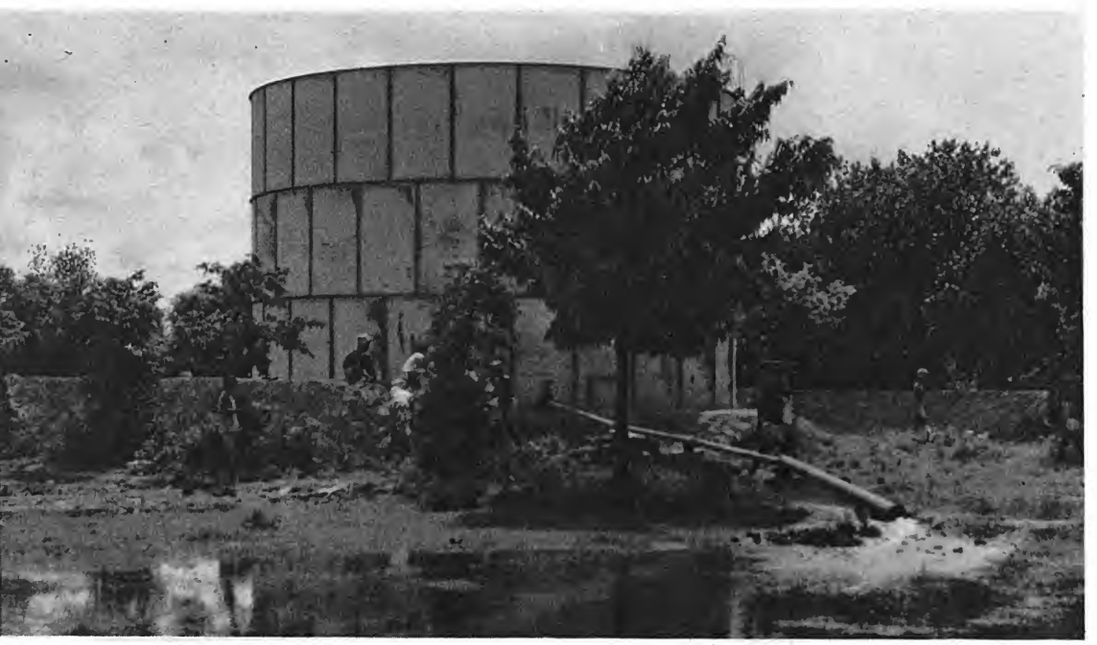
Flying the Hump from India to China takes you over three ranges. First the foot hills, nine to ten thousand feet high. Then the Himalaya mountains, fourteen to twenty-three thousand feet high, with one or two peaks going on up to almost thirty thousand. Then some smaller mountains, at the China end of the run, which are fairly dangerous because of the inaccessible territories they embrace. The entire region is a boiling pot for weather. The route is studded with wrecked planes that didn't quite make it.

Dawn has not quite arrived as we take off and head east. On the first leg of the trip the plane levelled off at five thousand feet. Now we climb higher and higher. The pounding of the engines decreases to a steady hum. The altimeter reads seventeen thousand, five hundred feet. Sometime ago, back at ten thousand feet, you had put on the oxygen mask. It is cold up here, twenty below zero Centigrade.

Through the windows there is nothing but a grayness which envelopes the world, presses against the wings, bears down on the plane. The leading edge of the wings begins to take on a coating of white beads. Gradually the beads build up into a uniform covering, one on top of the other, as when you sprinkle sugar on your cereal. Rime ice.

The crew chief points to the engines. On each propeller hub there is a long spindle of ice. Like the icicles on the rain spout back home, only much longer and bigger, sticking out vertically instead of hanging down. You notice the antenna; the wire is coated with a sheath of ice more than an inch in diameter. The windows become opaque.

The rubber de-icer boots which might remove the ice from the wings and the tail surfaces have been removed to lighten the plane and increase the airspeed. It's just one of those things. On these trips you fly until the ice gets so bad you can't fly any more . . . then jettison what tanks you can. If that doesn't help, there's always a parachute.



AAF Photo

A 5000-barrel storage tank at a B-24 base in India. The pipe in the foreground is draining the tank of water that has been used to test the gas line. Gas is pumped from tank to planes.

The oxygen mask cuts into the bridge of your nose and you swear at it; after three hours of this nagging pressure you know you will go crazy if you can't take the damned thing off . . . but you don't dare.

Finally the plane breaks into the clear-brilliant blue sky, pure in the sunlight. Down below the clouds bubble and foam. Off to the left are some peaks rising higher than the altitude of our plane. What if the ship had been off course? These boys are pretty sharp on their navigation.

Ahead, the bright glare of the sun through the windshield makes it impossible to look out. The sunlight feels good—until you realize that it would be easy for a Jap fighter to come zooming out of that dazzling light without any warning. Then you begin to wish you were back on instruments.

Four and a half hours now. Your feet are numbed with cold, even in fur-lined boots. You're dying for a cigarette but a load of aviation gas burns sort of easily—it's not worth the chance. Gradually the floor of clouds disappears to reveal the green hills of China. Flat tops of the mountains run along and then drop into nothing until they reach the waters of rushing streams thousands of feet below. Yet on top of each hill, high in the air, is a farm, a farm-house and people. The soil is cultivated, worked into terraces; rice grows.

Occasionally a village springs up in a valley. From this high altitude all the lakes are deep blue-green, all the rivers froth with foaming rapids.

The radio operator hands the latest terminal weather to the pilot. It's not too good. Three hundred foot ceiling, one mile visibility with rain and fog. Once more the plane plows into the clouds, once more the ice builds up on the wings. Then the whine of the engines increases as the props are pushed forward. A series of thuds, and the wheels drop into place. Nothing but fog around—but you know you are descending because your ears begin to plug and pop. Down to four thousand feet.

Three thousand feet . . . we're riding the leg of a beam now. The elevation of the field is about two thousand; it sits in the midst of some hills like a penny in the middle of a saucer. Losing five hundred feet a minute, coming closer to the field, closer to the mountains. At just the right second the big four-engined Liberator bomber turns, shuttling back and forth on the radio range. Will these clouds ever break?

The wisps of cumulus drift away from the plane as the ground appears and dead ahead lies a hint of the runway swathed in fog and rain.

With a little jar the big bird squats on the dirt and bounces along through the mud filled ruts. Coolies in blue quilted short-coats and straw hats the size of meat platters crowd around the plane; shivering GIs start the pumps to drain the gas from the tanks, tend to the cargo manifests and ship papers. You traipse with the crew to the mess hall. It's only a canvas tent with some plain wooden tables and stools. But the hot coffee, the plate of eggs and chips, and that cigarette—at last—are wonderful.

Just as you begin to thaw out and relax, the pilot gets up, and you know you'll be going back across in a few minutes.

The empty ship leaves the runway quickly and climbs up through the overcast of clouds with grace and speed that excites. This time the pilots climb to twenty thousand feet, top all the weather, and with a good tail wind the unloaded plane speeds over the terrain, soon passing by the three high peaks which are about the half-way mark.

It wouldn't be natural to be without any worries: this time you're sweating out the gas. To leave the maximum amount of fuel in China, planes drain off as much gas as possible.

By leaning out the fuel mixture as much as possible and throttling back on the engines to start their descent at the earliest possible moment, the pilots eke out enough gas to get into the valley and land at a field. When the crew chief checks the gas before refueling he looks down and says, "Aw, hell. We got gas left over." Probably enough for fifteen or twenty more minutes of flight, at greatly reduced power . . . and he says, "Aw, hell."

Sunlight is fading fast as the floor of the valley slips beneath the plane on the last leg of the flight. Now it's the co-pilot's turn to fly while the first pilot leans back in his adjustable seat to write a letter home.

Day turns to night. The many-veined rivers which flood the heart of the valley are like a series of trickles of quicksilver on a black velvet back-drop. Moonlight casts its reflection in the waters. Lights from houses and small bonfires flit like fireflies, and now and then a river boat shines its pilot light against the shores. At different altitudes the red and green navigation lights of other planes pass, just starting out on another Hump mission.

At the end of the flight we land on the home field with just one skip of the wheel. In another day the crew will be back doing the same thing again—taking their chances, beating the weather, the Japs and the engines.

They love their buddies, their planes; but they hate their jobs. They're tired and they're homesick, ready to go home when they can. There isn't one of them who wouldn't trade his Distinguished Flying Cross (with cluster) and his Air Medal (with clusters) for the touch of his wife's hand, a smile from his mother's face . . . and the smell of a good old, genuine Kansas City T-bone steak.

WHAT A PILOT FEELS

By Captain Thomas A. Reiner

Flight, even if under wartime conditions, can be a transcendent experience to a man who loves his plane.

If you are not a pilot, you might not understand. Then it is not your hand that advances the throttles, it isn't your strength that lifts the plane from the ground, makes it a clean, powerful, free being. And last, it isn't you who transforms an inanimate mass of steel into a throbbing, roaring giant—yet a slave to your whim.

The thrill in flying is in your knowledge that you are controlling a force greater than yourself. And what being able to control that force can do for you.

I could talk forever on the varied thrills that I feel when flying.

At midnight on a moonlight night when the world takes a new gown—suddenly I feel awed and closer to God than I have ever been before.

To climb through a solid overcast into the brilliant sun, leaving the rest of the world in a dark and gloomy cave—

To battle the elements in a howling thunderstorm, using my skill and strength and winning—

To make a perfect landing, so smooth that even a glass of water won't ripple—

That is something to make a man happy for months. Then a passion within you is aroused. As I wheel and soar, dive, roll and climb, every action of the plane is me—my desire and my will. And suddenly a strength greater than myself is within me. My heart seems about to overflow—my stomach muscles tighten—I can't talk, so I open my throat and scream for joy—holler until I can hear myself over the roar of the motors—to dissipate that strength of excitement of joy. Maybe I'm a little crazy—I don't care.

To be off the ground at the dawn, while the rest of the world sleeps; to climb and look down on the world; to fly over so many towns and places—wondering about each person and place—gives me a thrill.

I can't continue. I have 2,000 hours in the air, and each minute gave me a new and different thought with a thrill. In case I haven't mentioned it—I like to fly.

There is always something to be considered—always a question mark that rides with you. And when I step from a twisted mass that was once a plane and realize how close death was, it only makes me realize how wonderful it is to be alive.

I have flown many places, and each one was very interesting. All over the U. S., and a bit of Mexico. Then South America—mountains, water, jungles. And Ascension Island—finding it in the middle of an ocean. Then Africa—more jungles, deserts and mountains. Many strange lands and strange peoples. England, that cameo of an isle. France and Germany, which have given me something I shall never lose—a realization of just how wonderful America really is. Brussels, Paris, London, Aachen, Cologne, Frankfurt, the Rhine. Interesting? Yes! More than that—staggering.

(The effort expended toward destruction in this war has been beyond all imagination. If only this magnificent strength had been directed toward peaceful pursuits, what great things might have been created, instead of the great things that have been destroyed.)

I must admit that at times flying is work—hard work with nothing pleasant in the offing. But those moments only help heighten the thrills and pleasure the Air Forces and the people in it have given to me.

AIRMEN TAKEN

THE GERMANS TOLD US

by Lieutenant A. T. Waddingham, A. C.

The author flew with the 15th Air Force.

THE Germans knew a lot about us.

After the 7th Army had liberated our POW camp on April 29, 1945—I had been a prisoner for 13 months—I walked into the prison camp office and searched for the card I knew must be there. It carried my name, picture and some amazing information about me: Height, weight, build, face (round), scars (none).

The information was written in a firm hand, without indecision, as if copying from notes.

Where had the Nazis obtained that information as to my height and weight? They never examined me.

Another Lieutenant in our camp, a bombardier who got shot down, was being questioned by the interrogator. Where was he shot down — what kind of bombs was he carrying—and so on? Stubbornly, he refused to give any information beyond his name, rank and serial number.

He, too, got his card back later by the simple process of walking into the deserted prison office and helping himself. Then he asked a young German lad, the camp interpreter, to translate it for him. The interpreter came to a line: "Identifying marks: Scar on right knee."

"But I have no scar on my right knee," objected the bombardier.

Then he thought a minute, reached down, and pulled up his trousers leg. The scar was there: a forgotten relic of boyhood, long forgotten. He, too, had not been examined by the Germans, yet they knew about that scar. How?

At no time during my imprisonment did the Germans put pressure on me to reveal any military information they might have thought I had. Indeed, it was the reverse. "We don't need to *ask* you. We will *tell* you," they said brazenly. Then they proved it.

They opened a big book. It had pictures of individuals such as our American group commanders and squadron commanders. They could tell us, and did tell us, about our entire training: where we went to flying school, when we came overseas, how many missions we had gone on. It was amazing.

They kept up-to-date with their information. One day they said, "Your squadron commander, Johnson, generally flew in the leading plane. But we shot down that plane, and he wasn't in it. Where was he?"

Don't ask me how they got this accurate and up-to-the-minute information. I don't know.

I heard over a radio program that 70 per cent of all American POWs in Germany were airmen. I can well believe it. Sooner or later they got most of us, or so it seemed.

I got shot down on my 7th mission—but got credit for 13 missions altogether, because if we went above the 47th parallel, into the heavy-flak area, that counted double. The 47th parallel ran through Grotz, Vienna, Starr, Weiner-Neustadt and Regensburg.

APRIL 13, 1944, is a day I shall long remember. Our left-waist gunner had been killed. Our camera man had been killed—he was a new man and this was his first trip. But our Lib was doing all right for itself till flames broke out in the cabin. Then it was only a question of which way you jump, not if or when.

I jumped back and dove backward into the bomb bay. My skull hit on the steel catwalk. I lay there, almost knocked out. Then the plane twisted somehow and I fell out. One sturdy rip and the chute opened.

I fell in a little group. I was surprised. Then I saw they were not very friendly. They were shouting "Budapesth, Budapesth." I reached up, and that was when I collided with a lead pellet that wounded my left hand.

That made me mad. I stood up and drew my .45. I felt I had had it, as the saying goes —I was all through. But at least I wanted to sell my life dear. Just then two German Storm Troopers ran in. They pushed the Hungarian farmers aside and broke their muskets over their knees. They "rescued" me.

All of us who were wounded were put in a box-car and taken to a hospital in Budapesth. I can't complain of the treatment they gave me. For three weeks I was given sulfa drugs where I needed them. I had the services of a plastic surgeon.

Six weeks after my capture I was sent on to a POW camp at Sagan, spending six days and nights to get there in a freight-car with 50 other men. The clothes I had flown in were the clothes I lived in as a prisoner for 13 months—first at Sagan, afterwards at Mooseberg, northwest of Munich.

Mine is not the typical horror story of such camps as Dachau, for Nazi political prisoners. The Luftwaffe handled its prisoners of war fairly decently by comparison. I visited Dachau, on my way out of Germany; I saw the 40 flat-cars of starved, dead bodies.

I was riding in a jeep driven by some medical GI. Death was not new to me. I had seen young men killed when they had some chance of fighting back. Death was sort of peaceful. At least it was quick. But Dachau was unspeakable.

I leaned out of the jeep and vomited quietly and thoroughly.

PRISONER

WE AND THEY

by Felice Crainianu

This report by Felice Crainianu, a member of the Rumanian Red Cross, comes to Plane Talk's pages through the courtesy of the War Department Bureau of Public Relations. It tells, in English sometimes a little halting, a story of deep human implication.

THEY were over one thousand very young, slim, unsophisticated boys. Nazi propaganda had tried to represent them to us as ruthless gangsters, savage as convicts liberated from Sing-Sing on condition they would accomplish the most terrorizing raids. It was being whispered that they all had had the lobes of their ears cut out and that they were paid fabulous sums for each bombardment mission.

We who took care of them, and censored their letters, knew that they were just good sons and husbands and in many cases loving fathers, that they worshipped God and that they fought for the freedom of people and the peace of the world.

Sometimes we had to visit them after some heavy air raid. We drove through scenes of desolation, had often just been hearing of the death of people we knew, of the disaster brought to friends or relatives. And our own homes were often wrecked. But still we had to do our duty—the stern duty of the Red Cross that must extend a charitable hand to friend or foe in need of help.

Once we had to approach one of the camps through a place where twenty open coffins were laid on the ground, ready to receive twenty maimed bodies. Men, women and children were silently waiting, dreading the moment when they would be called inside to recognize in one of the corpses the loved one who had been missing from home since the raid. We could not help having rather a severe countenance on our first encounter with those who had brought such sorrow upon our people.

But we were met with such perfect candor that we felt at once that the big, clear-eyed boys confronting us could not have done it on purpose. They, on their part, seemed overcome with grief. They had just been taken to see the ruins; people had shaken their fists at them, they felt the hostility surrounding them; but they knew they had only aimed at military objectives without any cruel purpose. Some of them had their eyes full of tears. We had to comfort instead of scolding them.

AAF Photo

A Sergeant of the 15th Air Force delouses the effects of American airmen who have just been rescued from German prison camps in Rumania.

I said I understood what it must be to aim at an objective from some thousands of feet in the air and the difficulty they must have encountered, when hit by flak, to avoid the populated areas. I cannot forget the lifting of clouds from those young faces. "You see, she at least understands!" exclaimed one of them to his friend.

Our task as Red Cross workers was not easy to fulfil, and we were often subjected to bitter reproach. Why didn't we mind our own business, and find something more patriotic to do than helping the Anglo-Saxon destructors? But after a period of tranquillity, when air raids were forgotten, the same people would ask timidly, with a guilty air: "And how are they looking? What are they thinking of Rumania?"

In the country, where the peasants did not feel so much the consequences of the air raids, the feelings were unmixed, at the beginning at least. To somebody who tried to explain to them that the parachutists they were welcoming were enemies, some peasants replied: "But how should they be our enemies when they are our dear friends the Americans come to help us drive the Germans out of the country?"

This explains why much astonished airmen found themselves hugged and petted by peasants on touching Rumanian soil. Every one offered them the best they had. Colored eggs and cakes for Easter, chicken, cheese, and fruit, all the drinks that could be found in the house. We learned all this from the prisoners' letters. It was the more remarkable because our peasants do not like foreigners as a rule, and because we knew how scarce food can be in certain regions, especially at the beginning of spring.

From the letters we collected mentions of small deeds of kindness done by people in different stations of life which proved the general kind-heartedness the prisoners encountered in our country. I am just quoting from three missives without any commentaries:

"A guard just put a radio beside my ear. They seem to want to do pleasant things for us even if we are enemy aviators."

"The people that caught me and searched in my pocket found the picture of Francis and Winona. They thought it was my wife and baby and I was willing to let them keep thinking that. They put me on a bed before they interrogated me. While I was there, a lady came in with her baby and laid it down in my arms. I guess she thought it would remind me of mine."

"While I was floating down in my parachute, a Rumanian fighter plane circled around me and wagged his wings as if to say 'hello' and 'good luck.' I thought it was pretty decent of him."

THE dead were piously buried and many a tear was shed on them. In one village, the mayor engaged paid mourners for the funerals, because he thought it was his duty to insure proper weeping for someone who had died so far from his own people.

In another hamlet the villagers found the body of an Englishman very scarcely clothed, and decided to provide the burial outfit themselves. They dressed him in the most beautiful white peasant clothes they could find amongst them, because it is fit a young man should be buried in white as a bridegroom.

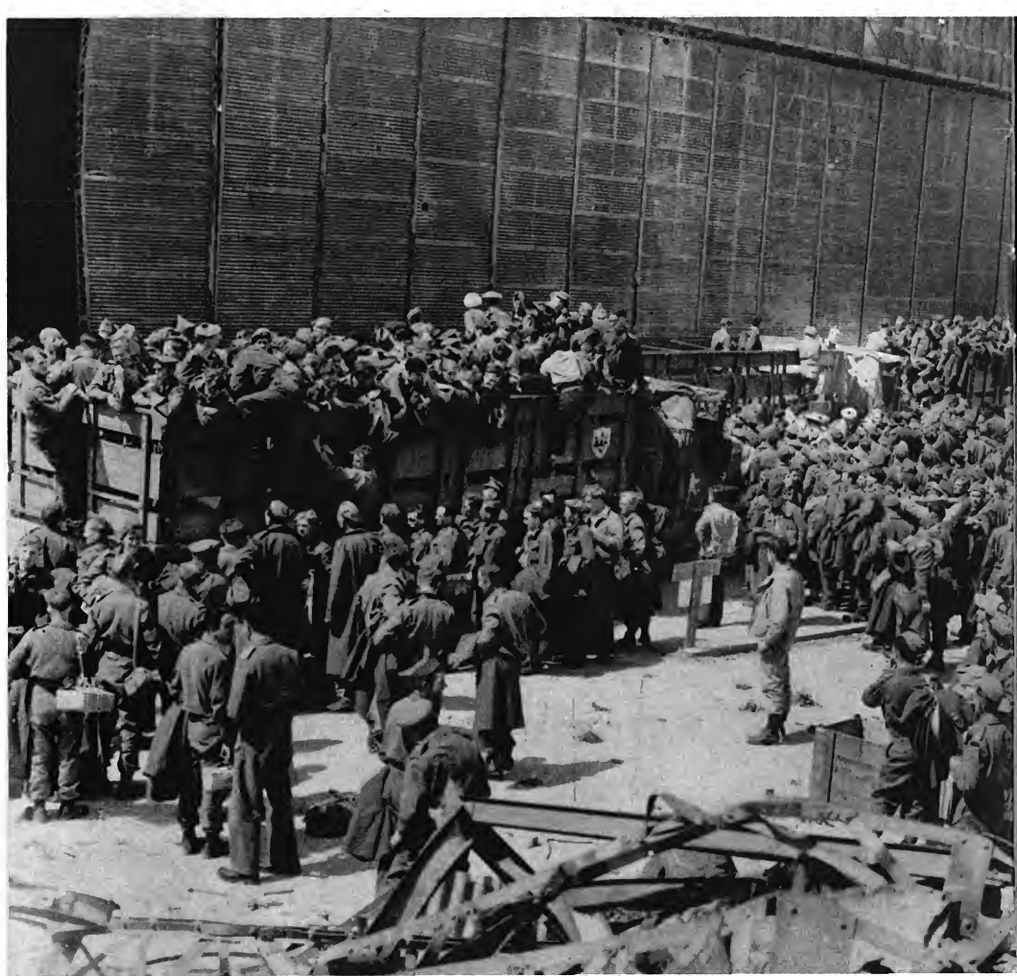
In another place, when a most solemn burial was organized by the local authorities, the priest addressing the assembled youths told them they should keep deep in their hearts the memory of a hero who had come to die in their village, and try to be as brave as he. Everywhere flowers were showered and wax candles lighted on the graves. Everywhere there was a prayer recited, or at least a simple, "May he rest in peace," pronounced from the bottom of the heart.

In mentioning all this I have in mind the many sorrowful mothers whose sons did not come back. They should know, if that may lessen their grief, what pious care presided over the freshly dug graves.

And to end this, I would like to emphasize, for the sake of the boys who fretted during months behind the barbed wire fences we had to keep around them, how whole-heartedly we did the small things we were allowed to do for them. They never guessed what a constant fight we had to put up, to keep our right to visit the camps, and what incessant opposition the Germans met in our organization, whenever they tried to take over the survey of the Anglo-American prisoners.

I think it is fair the boys should learn now, when they are free and safely away overseas, that the "little" we did for them, in their opinion, was considered "too much," and often we feared the threat that we ourselves would be put behind barbed wire.

Great fleets of trucks, lately used to pour war material into Germany, have been helping repatriate American prisoners of war. The Americans here, some wearing British uniforms, were some of 50,000 who arrived at Rheims, France, in one week, after being flown from Nazi prisons.



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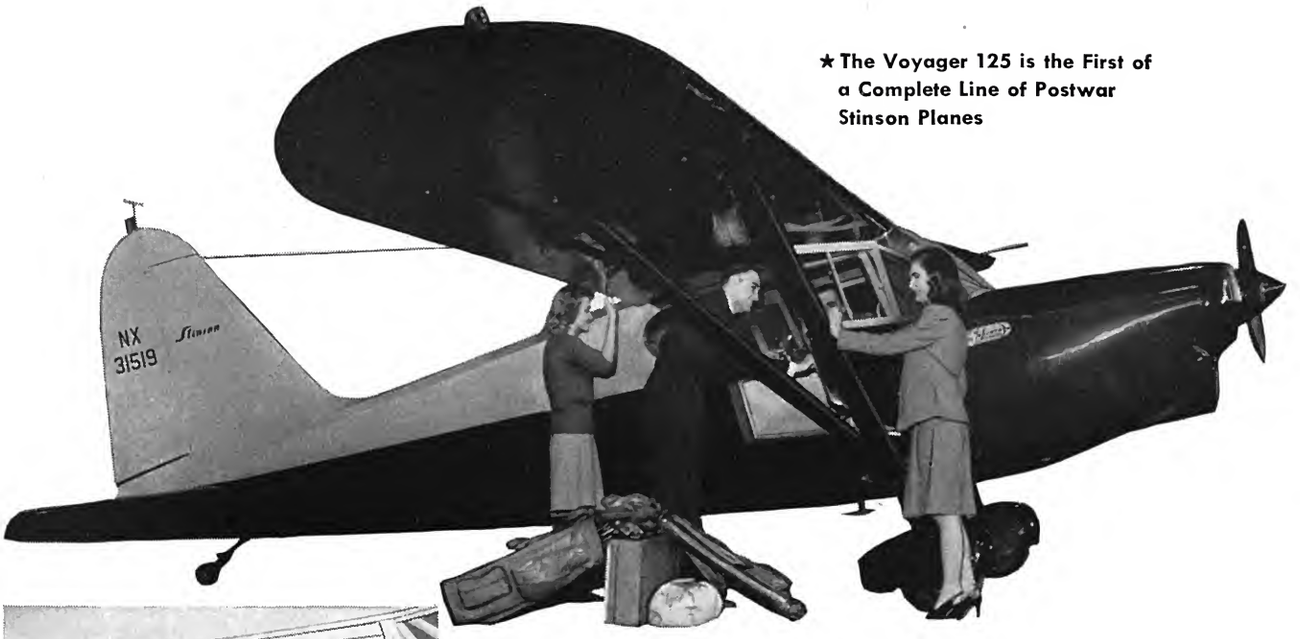

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Reproduced from an official U. S. Navy Kodachrome, this colorful picture shows a Stinson "Flying Jeep" operating from a Naval Aircraft Carrier.